Planning for California's 2030 Emissions Reduction Goal

Partnership for Market Readiness Workshop
San José, Costa Rica

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California Air Resources Board

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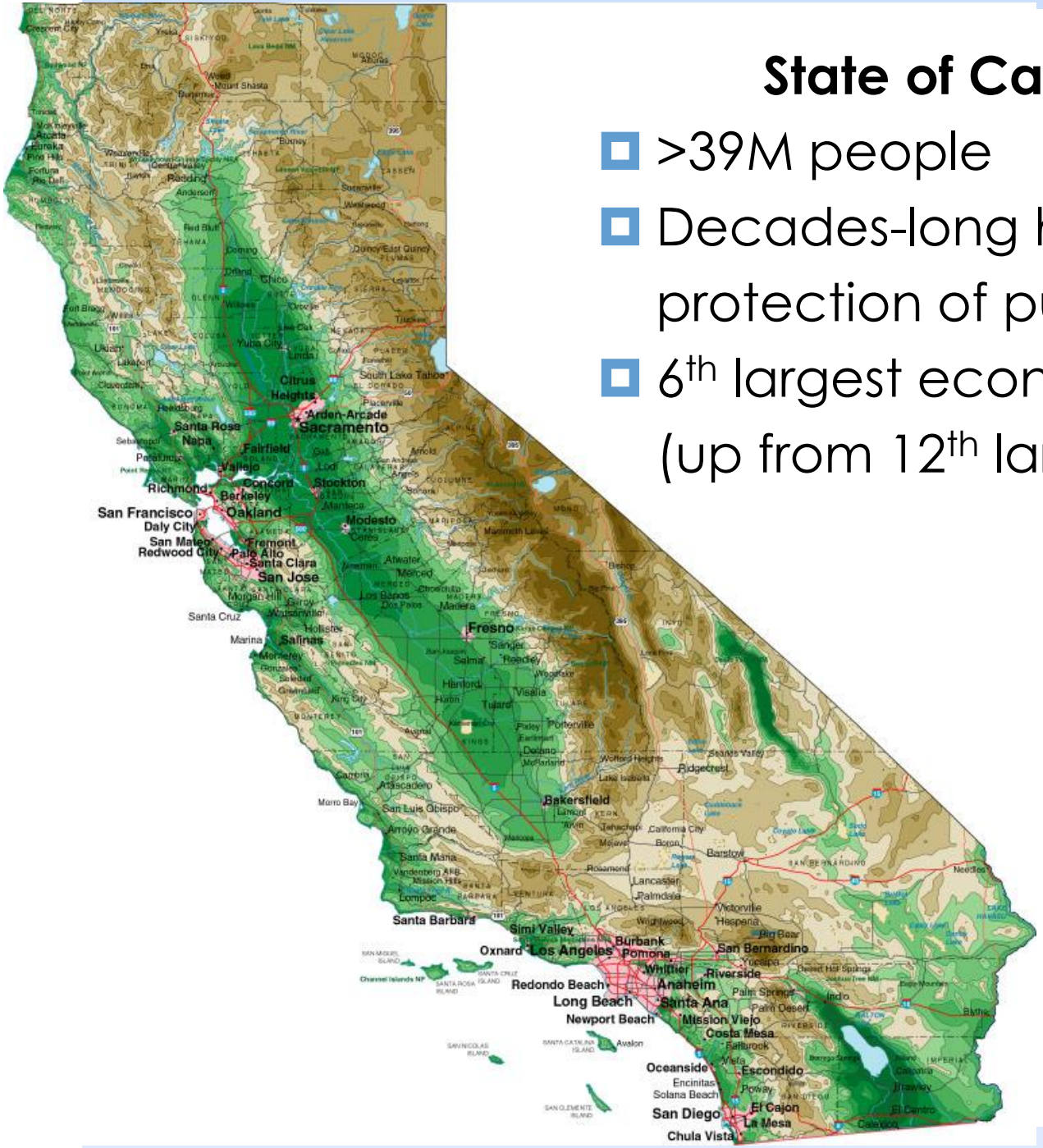


State of California

- >39M people
- Decades-long history of protection of public health
- 6th largest economy in world (up from 12th largest in 2012)

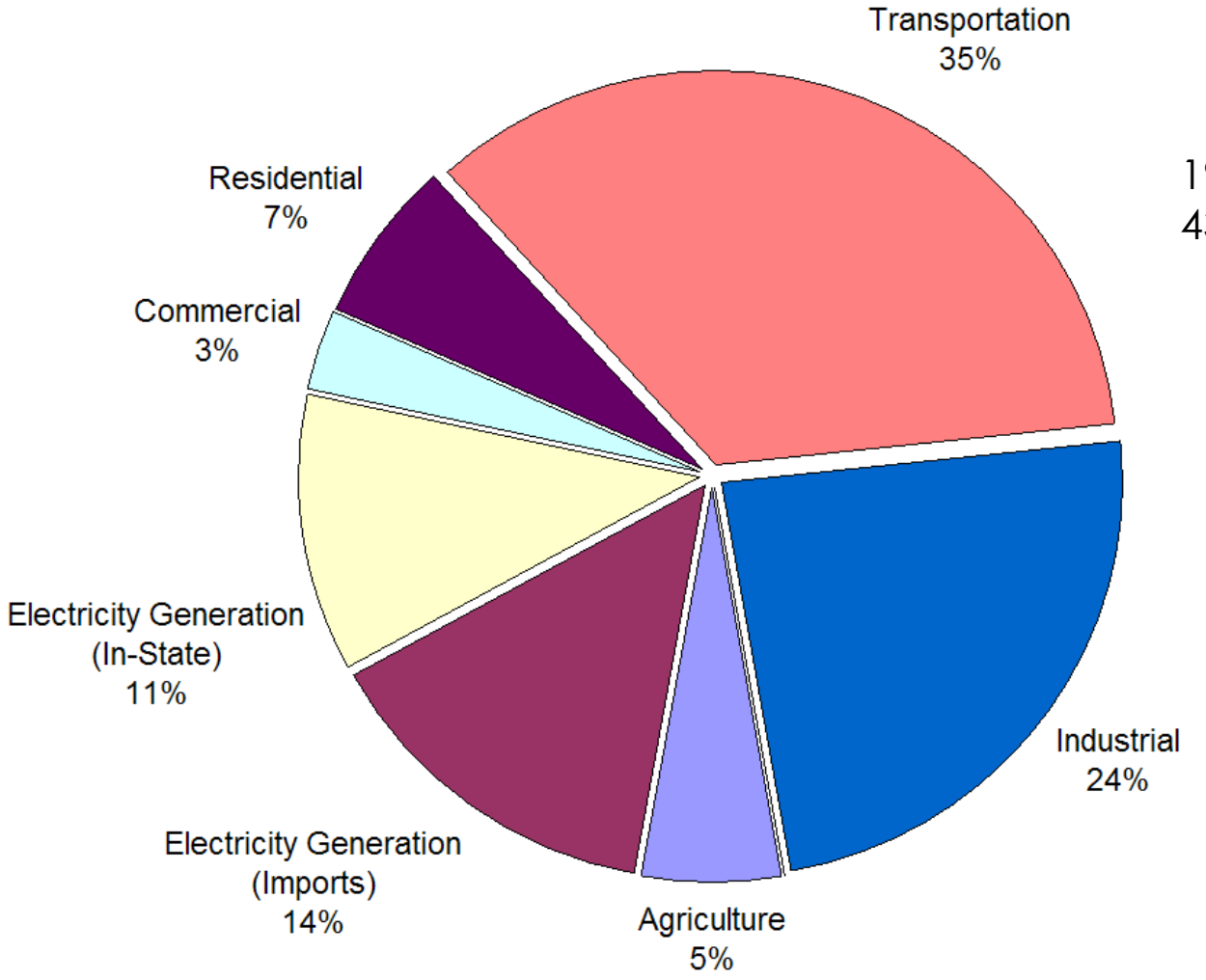
Directives and Legislation

- Climate Change Scoping Plan required by Assembly Bill 32 (2006 legislation)
  - Included an economy-wide Cap-and-Trade Program
- Executive Order B-30-15 (2015) and Senate Bill 32 (2016)
  - Establish GHG emissions reduction target of 40% below 1990 levels by 2030
  - Requires Air Resources Board to update the Scoping Plan to incorporate the 2030 greenhouse gas target
- Assembly Bill 197 (2016) directed ARB to:
  - Consider the social costs of GHG reductions
  - Prioritize measures resulting in direct emissions reductions
  - Follow existing AB 32 requirements—including considering cost-effectiveness and minimizing leakage

Objectives for Scoping Plan Policies

- Achieve 2030 target and position state to meet 2050 target
- Provide direct GHG emissions reductions
- Minimize emissions leakage
- Support cost-effective and flexible compliance
- Support U.S. EPA Clean Power Plan (CPP)
- Support climate investment for programs in disadvantaged communities
- Provide air quality co-benefits and protect public health
- Facilitate sub-national and national collaboration

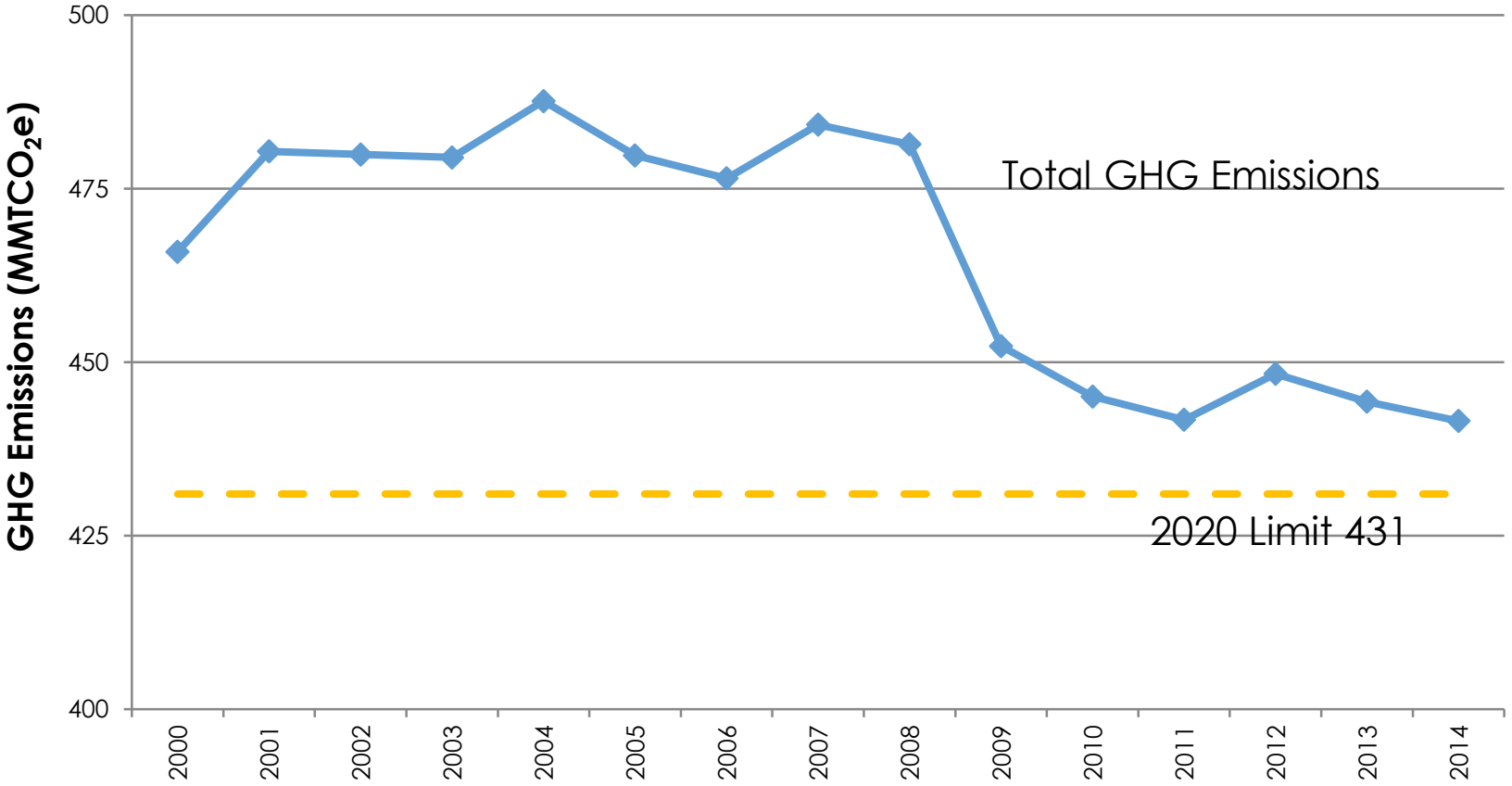
California GHG Emissions Sources by Sector



1990 level of
431 $MMTCO_2e$*

*https://www.arb.ca.gov/cc/inventory/pubs/reports/staff_report_1990_level.pdf

California GHG Progress to Date (as measured by emissions inventory)



https://www.arb.ca.gov/cc/inventory/inventory.htm

Role of Models in the Scoping Plan

- Help analyze GHG impacts of policies and technology, including future projections
- Help understand cost impacts of different policies
- Several models exist to support these types of analyses

PATHWAYS

- Estimates GHG reductions and direct technology, energy, and fuel costs of the scenarios
- Integrated economic and energy sectors to reflect interactive effects

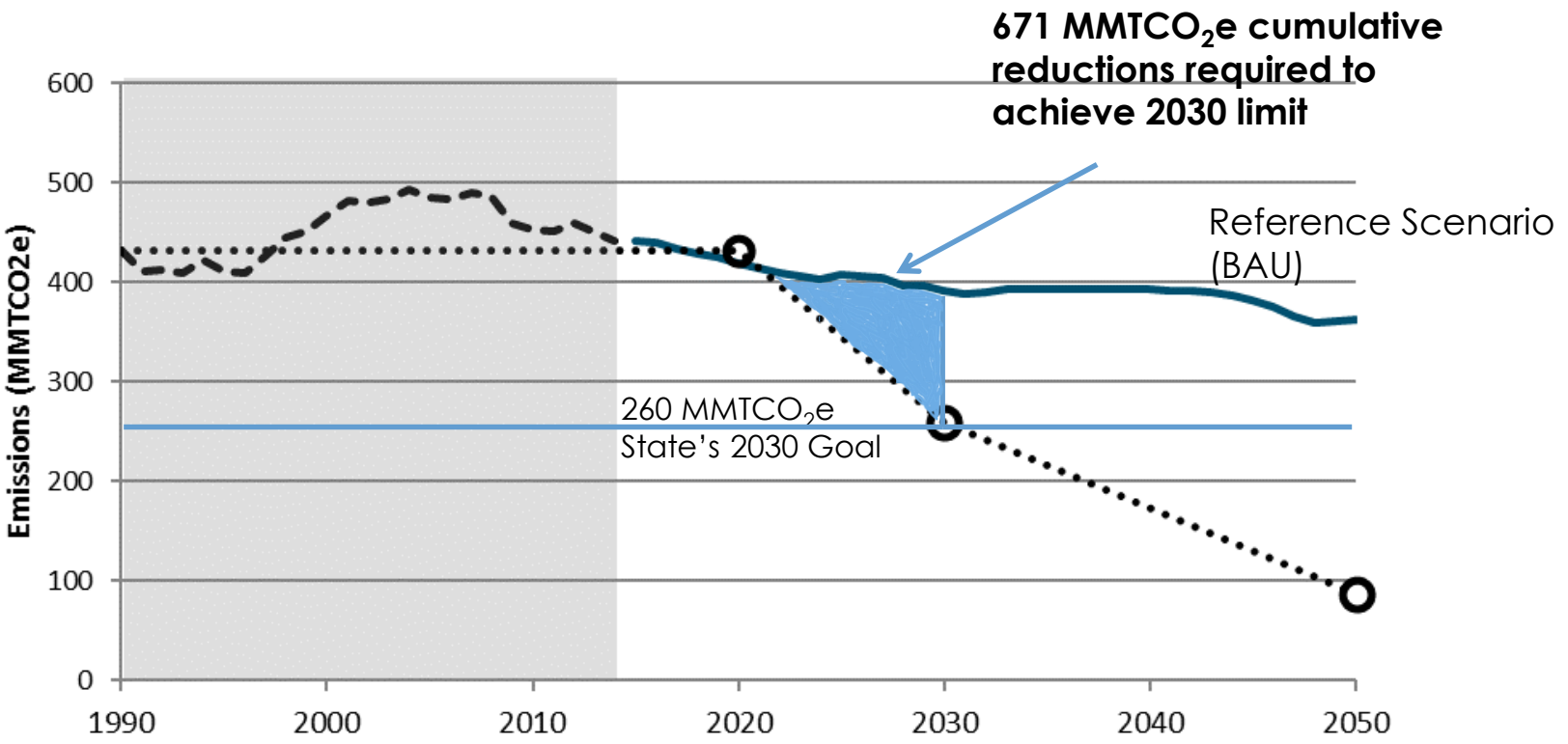
REMI

- Models the economic impact of GHG reduction scenarios on the California economy
- Uses technology and fuel costs from PATHWAYS as an input
- Estimates the indirect and induced impacts of GHG reduction scenarios
- Provides estimates of impact of scenarios on industrial sectors, individuals, and overall California economy

2030 Baseline Policies and Measures

- 2030 GHG emissions estimated to be ~300 $MMTCO_2e$ for baseline policies and measures
  - 50% renewables by 2030 and doubling of building energy efficiency
  - Implementation of the Short-Lived Climate Pollutant Plan
  - Sustainable community development
  - Mobile Source Strategy--helps State achieve its federal and State air quality standards
  - Low Carbon Fuel Standard
  - Sustainable Freight Action Plan
- 2030 baseline policies and measures do not achieve the 2030 target of 260 $MMTCO_2e$

Reference Scenario



Closing the Gap

- Consider legislative direction and Scoping Plan objectives
- Potential options to fill remaining gap:
  - Enhance and extend existing programs
  - New policies and regulations
- Evaluated three draft scenarios
  - All three scenarios rely on a mix of measures
  - Draft Scoping Plan scenario (includes Cap-and-Trade Program)
  - No Cap-and-Trade Program (Alternative 1)
  - Carbon Tax (Alternative 2)

Draft Scoping Plan Policy Scenario

- 2030 Baseline Policies and Measures
- New Refinery Efficiency Measure for All Facilities in the Sector
  - Fewer GHG emissions per barrel of refined product
  - Estimated to achieve 20 percent GHG reductions by 2030
- Post-2020 Cap-and-Trade Program

Scenario Policy Analysis: Draft Scoping Plan

Benefits

- Majority of reductions due to baseline policies and measures
- New measures delivers refinery facility GHG emissions reductions
- Cap-and-Trade Program constrains emissions through a declining emissions limit and scales to provide additional reductions if other measures do not perform as expected
- Provides compliance flexibility and allows for continuation and expansion international and subnational collaboration through linkages
- Free allocation to minimize emissions leakage where needed
- Provides auction proceeds for GHG reductions
- Can-be adapted for compliance with federal Clean Power Plan

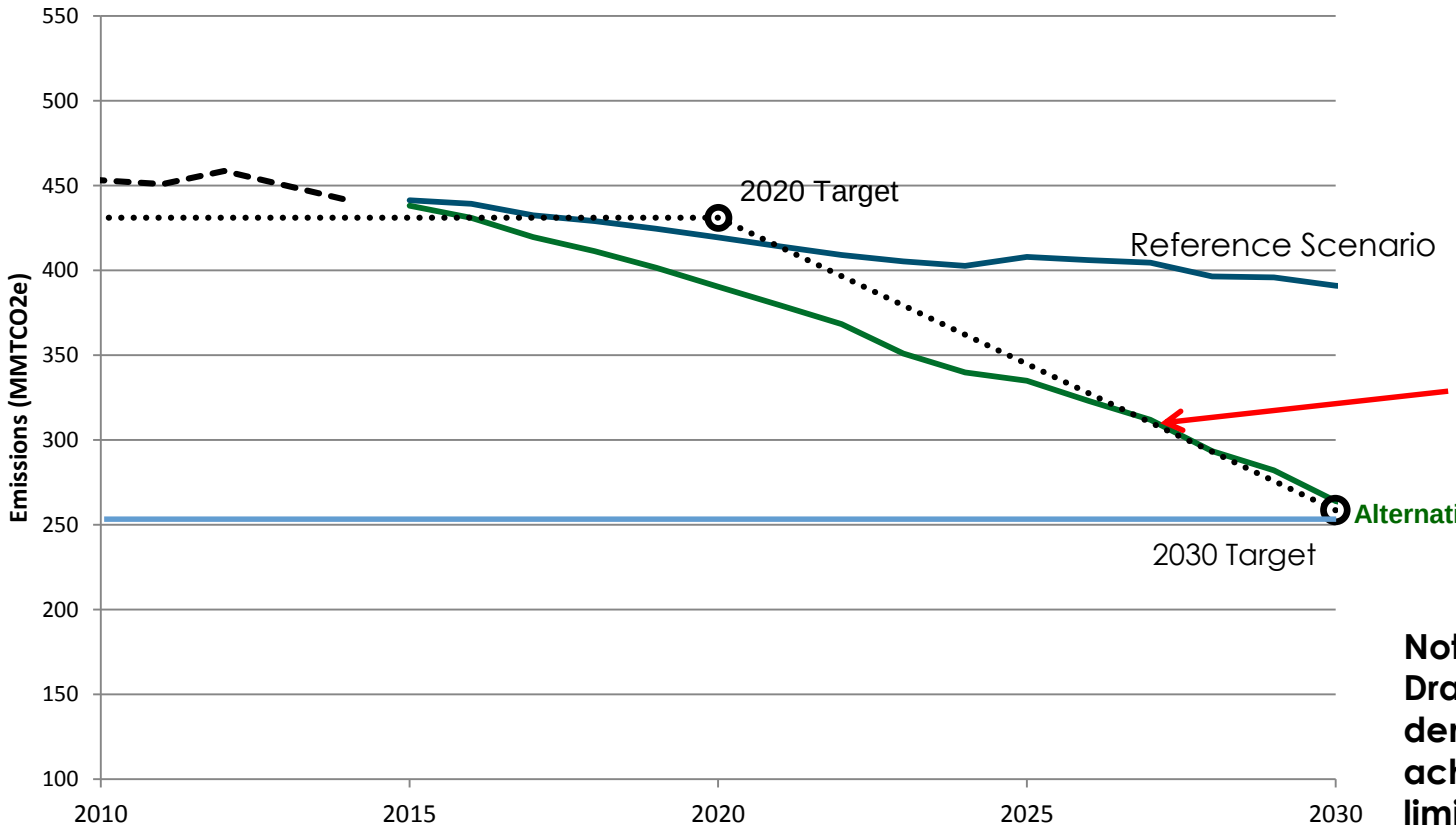
Drawback

- Ongoing differing legal interpretations about authority.

Alternative 1(No Cap-and-Trade Program)

- 2030 Baseline policies and measures
- 60 percent Renewables Portfolio Standard
- 25 percent Low Carbon Fuel Standard
- 30 percent GHG reduction for refineries by 2030
- 25 percent GHG reduction for all other industrial sectors by 2030
- Early retirement and replacement of older inefficient gasoline light-duty vehicles and furnaces
- 5 percent renewable gas standard for natural gas suppliers
- Heat pumps in buildings

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



Population and energy demand overtake rate of reductions and emissions start to grow

Note: January SP Draft will demonstrate how to achieve the 2030 limit for Alternative 1

Scenario Policy Analysis: Alternative 1(No Cap-and-Trade)

Benefits

- Under ideal conditions, estimated to deliver more cumulative emissions reductions than needed to achieve the 2030 limit (but emissions start to increase in later years)
- Majority of reductions due to enhanced known commitments
- New measures deliver refinery and industrial facility GHG emission reductions

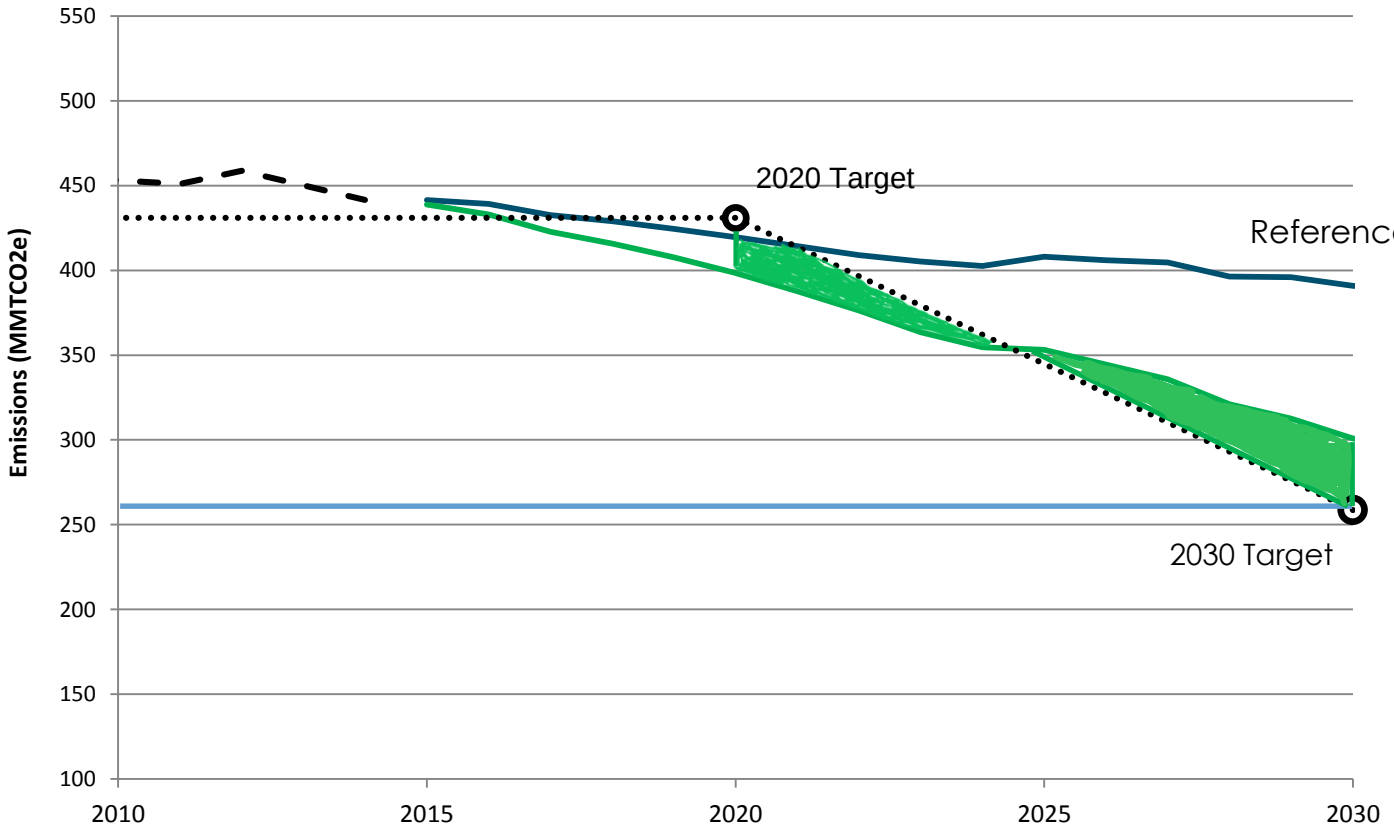
Drawbacks

- New statutory authority is needed for some policies and measures
- Fewer options for minimizing emissions leakage
- Limited opportunities for international or subnational collaboration through linkages
- No auction proceeds to fund emissions reductions
- Need additional funding for new incentive programs---(e.g. retiring & replacement of older cars)
- Would need to identify other measures for compliance with federal CPP

Alternative 2 (Carbon Tax)

- 2030 Baseline Policies and Measures
- New Refinery Efficiency Measure for All Facilities in the Sector
  - Fewer GHG emissions per barrel of a refined product
  - Estimated to achieve 20 percent GHG reductions by 2030
- Carbon tax post-2020

Preliminary GHG Modeling Results: Draft Scoping Plan Scenario or Alternative 2



Draft Scoping Plan Scenario or Alternative 2:
~88-98 $MMTCO_2e$ reductions required from Cap-and-Trade Program or carbon tax to close the gap.

Scenario Policy Analysis Alternative 2 (Carbon Tax)

Benefits

- Majority of reductions due to known commitments
- New measure delivers refinery facility GHG emissions reductions
- Provides compliance flexibility
- Could provide revenue for emissions reductions, or for other uses

Scenario Policy Analysis: Alternative 2 (Carbon Tax)

Drawbacks

- Carbon tax does not include an explicit emissions limit (i.e., does not guarantee reductions)
- If reductions aren't realized, additional measures need to be implemented quickly to make up unrealized reductions
- New statutory authority is needed
- Options to minimize emissions leakage are unclear (include exemptions for trade exposed sectors, putting burden on other sectors for GHG reductions)
- May not achieve reductions beyond the known measures
- No clear path for international and subnational collaboration through linkages
- Potential for additional GHG reductions at covered entities
- Does not include an enforceable mandate as required by U.S. EPA to reduce emissions at the stack - would need to identify other measures for compliance with CPP

Next Steps

- Identify the structure of the carbon tax in Alternative 2
  - Collaborate with Economic Reviewers and stakeholders
- Continue to refine cost estimates
  - Capital costs
  - Incentives for retirement and replacement
- Address uncertainty in GHG reductions and costs
- Analyze economic impact on disadvantaged communities
- Release full Draft Scoping Plan in January 2017
- Board vote on Final Scoping Plan in Spring 2017

For More Information

- Scoping Plan website https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm
- Draft 2030 Target Scoping Plan Updatehttps://www.arb.ca.gov/cc/scopingplan/2030target_sp_dd120216.pdf
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