



# Public Workshop on the 2030 Target Scoping Plan

*December 16, 2016*



# Welcome and Opening Remarks

All workshop materials and webcast link:

[www.arb.ca.gov/cc/scopingplan/meetings/meetings.htm](http://www.arb.ca.gov/cc/scopingplan/meetings/meetings.htm)

E-mail address for online audience questions:

[auditorium@calepa.ca.gov](mailto:auditorium@calepa.ca.gov)

# Workshop Outline

- ▣ Overview of Scoping Plan Discussion Draft
- ▣ Economic modeling
- ▣ Schedule
- ▣ Environmental Justice Advisory Committee  
comments with discussion
- ▣ ARB Open Discussion

# Discussion Draft

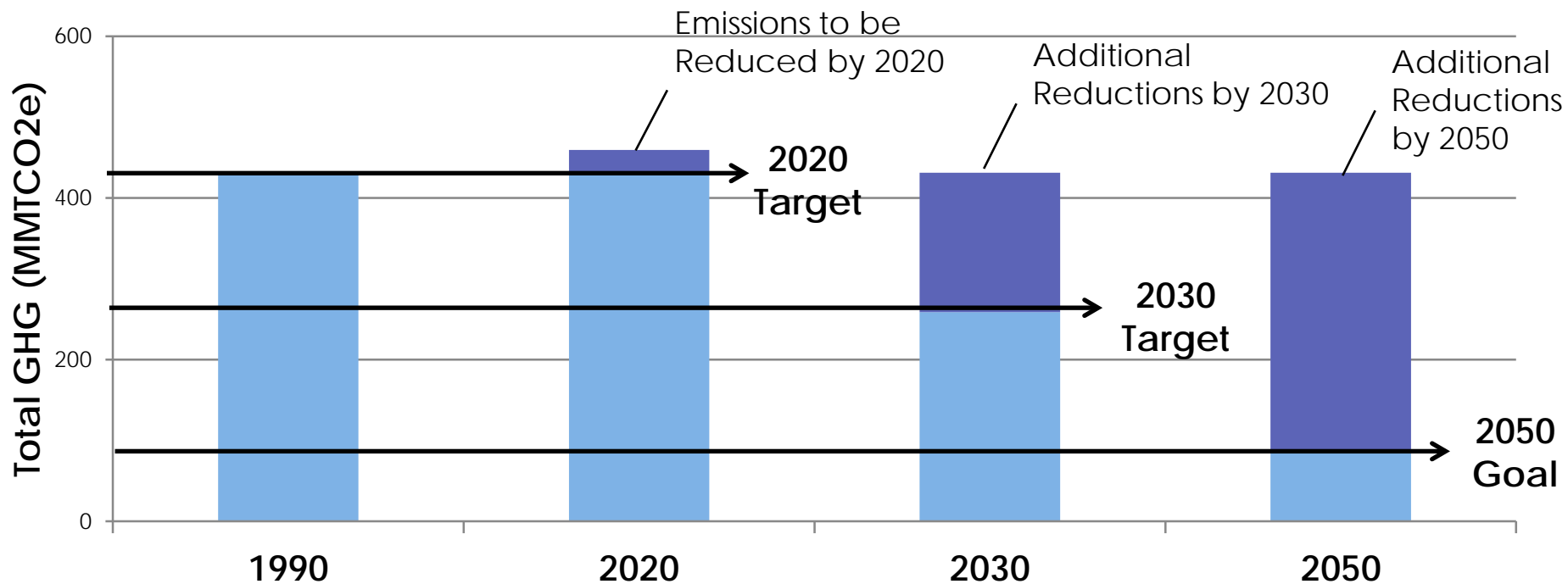
# AB 32 Scoping Plan Update

- Sets framework to achieve 2030 target and put State on path to achieve long-term climate goals
- Progress will be through regulations, partnerships, and incentives
- Update is part of Administration's overall climate strategy
  - Safeguarding California
  - Climate Change Research Plan

# New Directives and Legislation

- ▣ Executive Order B-30-15
  - Reduce GHG emissions 40% below 1990 levels by 2030
  - Update Scoping Plan to incorporate 2030 GHG target
- ▣ Senate Bill 32 (SB 32) codifies 2030 GHG target
- ▣ AB 197
  - Consider the social costs of GHG reductions
  - Prioritize measures resulting in direct emission reductions
  - Follow existing AB 32 requirements—including considering cost-effectiveness and minimizing leakage

# GHG Reduction Targets



\*Executive Order B-30-15 and SB 32

\*\*Executive Orders S-3-05 and B-16-2012

Note: MMT = Million Metric Tons

# Scoping Plan Update Process

- ▣ Being developed in consultation with many stakeholders
  - ▣ Climate Action Team
  - ▣ Environmental Justice Advisory Committee
  - ▣ Local and regional agencies
  - ▣ Industry and interested public stakeholders
- ▣ Workshops & Board Hearings
  - ▣ Concept Paper (June 2016)
  - ▣ Discussion Draft (December 2016)



# Advisory Groups

- Economic Advisors
  - Five core academic economists and energy modelers
  - Providing input on tools and modeling assumptions to evaluate economic impact of Scoping Plan
- Environmental Justice Advisory Committee (EJAC)
  - Over 20 Committee meetings and regional community meetings to date
  - Draft initial recommendations by sector
  - Next meeting to discuss Discussion Draft and other related reports
    - December 21-22, 2016 (Bakersfield)

# California Climate Strategy

- ▣ 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
- ▣ Provide air quality co-benefits
- ▣ Protect public health

# Discussion Draft

## Key Sectors

# Recommendations to Transition Beyond 2020

- ▣ Six key sector focus areas
  - ▣ Energy
  - ▣ Industry
  - ▣ Transportation
  - ▣ Natural and Working Lands including Agriculture
  - ▣ Waste Management
  - ▣ Water
- ▣ Structure
  - ▣ Outline sector vision / high-level goals
  - ▣ Acknowledge cross-sector interactions
  - ▣ Identify measures to help achieve 2030 target

# Sector Vision

- ▣ “Looking to the Future” section intended to identify high-level goals for sector
- ▣ Intended to capture broad actions that put the sector on the path to achieve the mid-term and long-term GHG reduction goals

# Cross Sector Interactions

- ▣ Movement away from silo-based approaches
- ▣ Intended to acknowledge interactions and encourage policy development that takes advantage of sector synergies
- ▣ Multi-sector analysis also acknowledges trade-offs and identifies potential impacts

# Sector Measures

- Known Commitments already required or committed to in plans or statute
  - SB 350 - increase renewable energy and energy efficiency
  - SB 1383 - Short-Lived Climate Pollutant Plan
  - SB 375 – support sustainable community development
  - Mobile Source Strategy- help State achieve its federal and state air quality standards
- Known Commitments provide the foundation for the majority of measures identified in each sector to meet the 2030 target
- Potential new measures may need additional evaluation and may have barriers affecting successful deployment
- Some sectors have started to map out supporting actions needed to help move forward with goals and measures

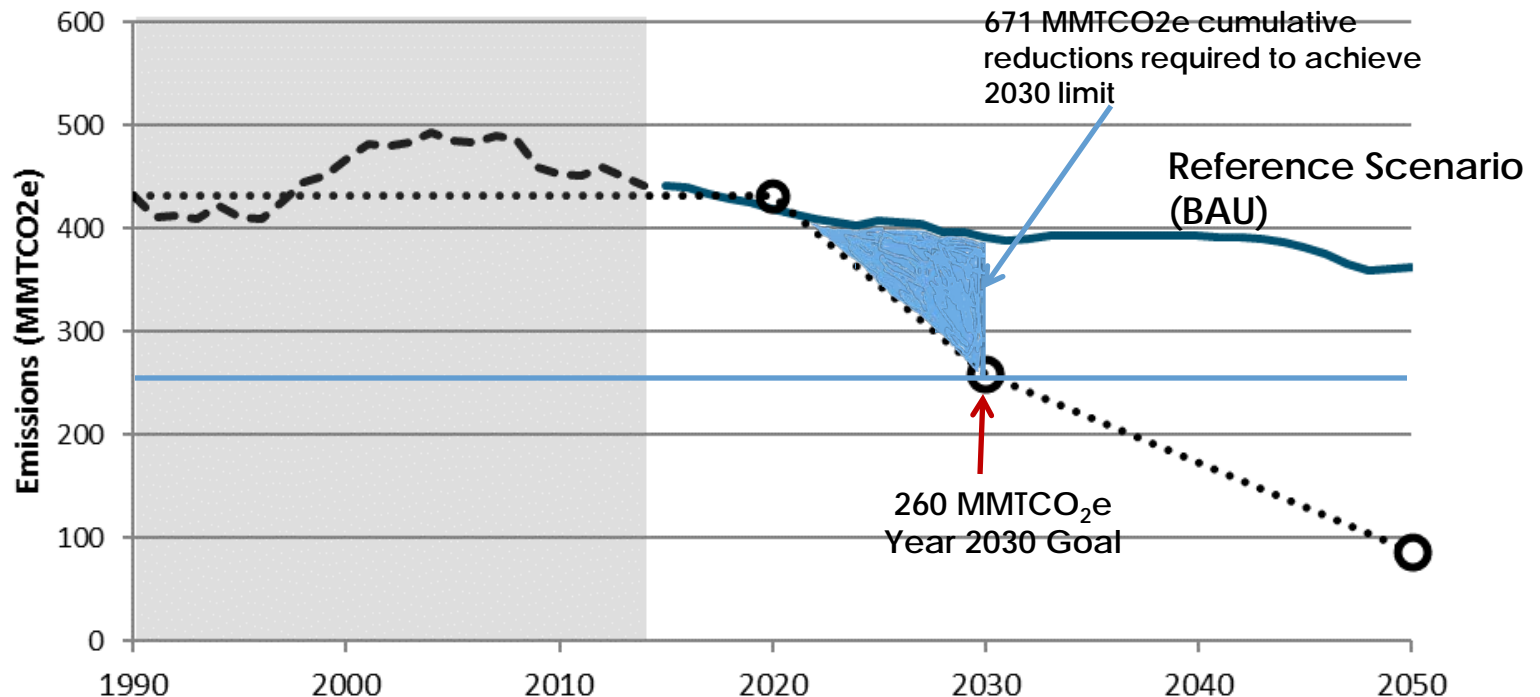
# Discussion Draft

Strategy to 2030 – Scenario Analysis



# Reference Scenario

- 2030 GHG emissions estimated to be ~301 MMTCO<sub>2</sub>e for known commitments and do not achieve target



# Closing the Gap

- Evaluated three preliminary draft scenarios
  - Scoping Plan Scenario
  - No Cap-and-Trade (Alternative 1)
  - Carbon Tax (Alternative 2)
- Considered legislative direction and Scoping Plan objectives in mapping out options
- Scenarios rely on mix of measures
  - Enhance and extend existing programs
  - New policies and regulations
- Measure implementation details determined in individual agency regulatory and program development processes; assumptions made for purposes of modeling potential emission reductions, cost, and environmental impacts

# Draft Scoping Plan / Carbon Tax Scenarios

- Draft Scoping Plan Scenario
  - 2030 Known Commitments
  - New Refinery Efficiency Measure (20% reduction by 2030)
  - Post-2020 Cap-and-Trade Program
- Carbon Tax Scenario (Alternative 2)
  - Same as Draft Scoping Plan but substitute carbon tax for Cap-and-Trade Program

# No Cap-and-Trade Scenario

- ▣ Enhanced Known Commitments
- ▣ New measures
  - ▣ Refinery Efficiency Measure (30% reduction by 2030)
  - ▣ Industrial sector efficiency (25% reduction by 2030)
  - ▣ Increased RNG utilization
  - ▣ Electric heat pumps in buildings
- ▣ New incentive programs
  - ▣ Early retirement/replacement of older gasoline light-duty vehicles and gas furnaces

# Policy Analysis

## Draft Scoping Plan Scenario

### Benefits

- ▣ Majority of reductions due to baseline policies and measures
- ▣ New measure delivers refinery facility GHG emission reductions
- ▣ Declining cap delivers additional GHG reductions beyond other measures to achieve the 2030 limit
- ▣ 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
- ▣ Free allocation to minimize emissions leakage, where identified
- ▣ Provides compliance flexibility and allows for continuation and expansion international and subnational collaboration through linkages
- ▣ Provides auction proceeds for Greenhouse Gas Reduction Fund Investments
- ▣ Can-be adapted for Clean Power Plan (CPP) compliance mechanism

### Drawbacks

- ▣ Different legal interpretations about authority

# Policy Analysis

## No Cap-and-Trade (Alternative 1)

### Benefits

- ▣ Under ideal conditions, delivers more cumulative emission reductions than needed to achieve 2030 target, 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 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 Greenhouse Gas Reduction Fund Investments
- ▣ Need to identify other measures for compliance with CPP
- ▣ Need additional funding for new incentive programs
- ▣ Uncertainty may result in lower reductions and that target is not achieved

# Policy Analysis

## Carbon Tax Scenario (Alternative 2)

### Benefits

- ▣ Majority of reductions due to known commitments
- ▣ New measure delivers refinery facility GHG emission reductions
- ▣ Provides compliance flexibility
- ▣ Could provide revenue for potential Greenhouse Gas Reduction Fund Investments, or other uses

### Drawbacks

- ▣ Carbon tax does **not include** an explicit emissions limit (does not guarantee reductions-uncertainty)
- ▣ If reductions aren't realized, additional measures need to be implemented quickly to make up unrealized reductions

# Policy Analysis

## Carbon Tax Scenario (Alternative 2) cont.

### Drawbacks, cont.

- ▣ New statutory authority is needed
  - Structure of carbon tax is unclear absent of legislative direction—difficult to evaluate
  - 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
- ▣ Uncertain potential for additional GHG reductions at covered entities
- ▣ Does not include an enforceable mandate as required by US EPA to reduce emissions at the stack - would need to identify other measures for compliance with CPP



# Planned Modeling Updates

## Cap-and-Trade and Carbon Tax Scenarios

- ▣ Energy efficiency alignment with SB 350
  - ▣ Reduce EE assumptions to reflect 2x additional achievable energy efficiency (AAEE) in 2015 IEPR demand forecast
- ▣ Behind-the-meter (BTM) rooftop PV
  - ▣ Reduce to 18 GW in 2030 so Reference and Draft Scoping Plan Scenarios are the same
- ▣ Delay measure implementation to 2020 for:
  - ▣ Landfill gas and agricultural methane mitigation
  - ▣ Industrial measures
  - ▣ Off-road vehicle measures

# Planned Modeling Updates

## No Cap-and-Trade Scenario

- ▣ Increase RPS ~62%
- ▣ Increase VMT reductions ~2%
- ▣ Increase high efficiency heat pumps
- ▣ Increase rail electrification
- ▣ Reduce demand of in-state aviation

# Discussion Draft

Collaboration

# Advocacy & Collaboration

- ▣ Regional and local initiatives
  - ▣ Locally-driven efforts critical for AB 32 success
  - ▣ Emissions being reduced across sectors (codes, standards, general plan improvements; SCSs; improve municipal operations)
  - ▣ Proposing regional plan level per capita targets to promote sustainable growth (other metrics or different per capita or service population based targets may be appropriate)
  - ▣ Beyond plan level, projects can support State's goals – new development implement CEQA mitigation using all feasible measures, no net GHG increase
- ▣ International efforts
  - ▣ State committed to working at national and subnational level to reduce GHGs

# Scoping Plan Evaluations

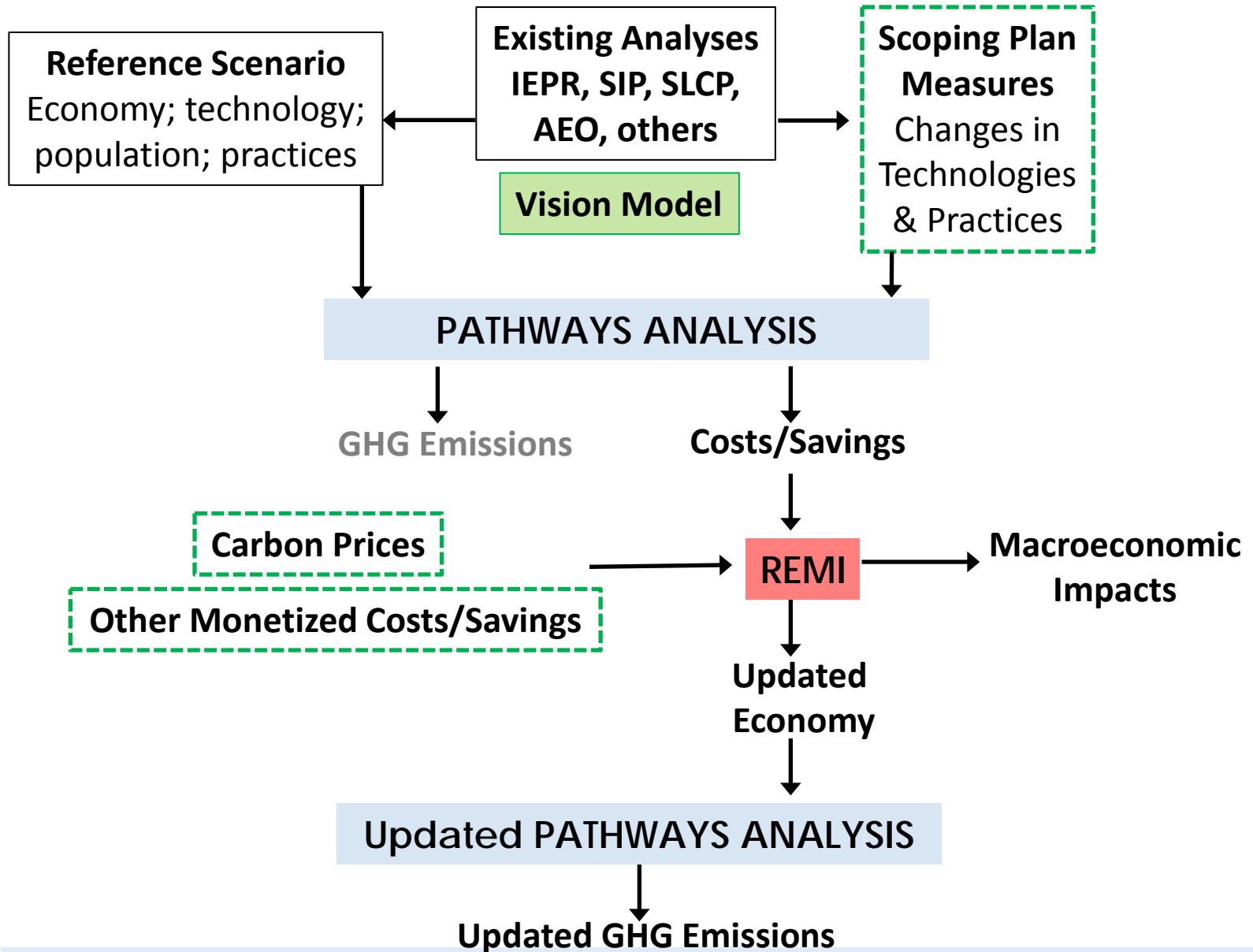
- ▣ CEQA environmental analysis
- ▣ Economic
- ▣ AB 197 Ranges Per Measure
  - ▣ GHGS
  - ▣ Criteria and Toxics
  - ▣ Social cost of carbon

# Economic Modeling Update

# Economic Modeling Outline

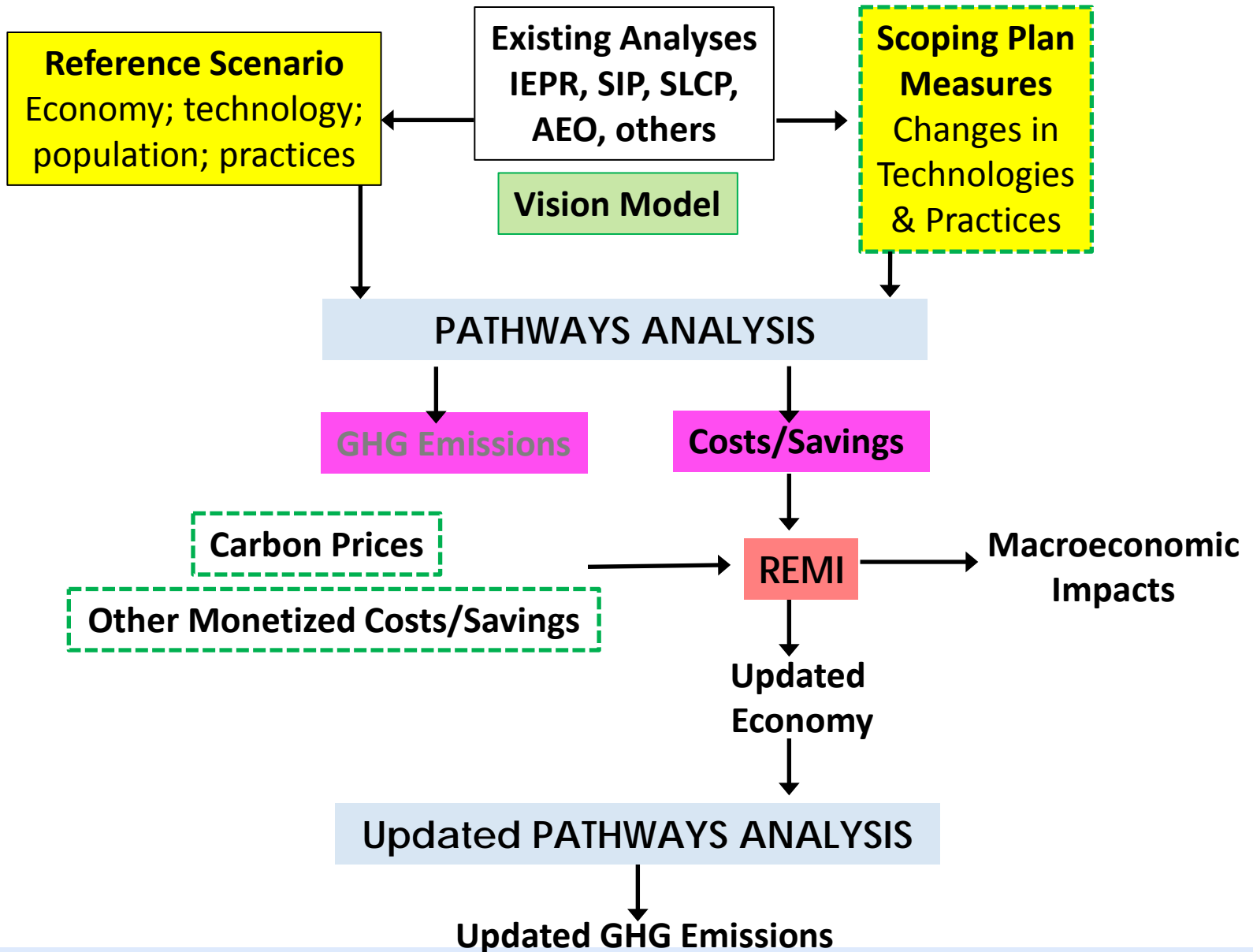
- ▣ Modeling updates
- ▣ Uncertainty
- ▣ Next steps

# SCOPING PLAN ECONOMIC ANALYSIS

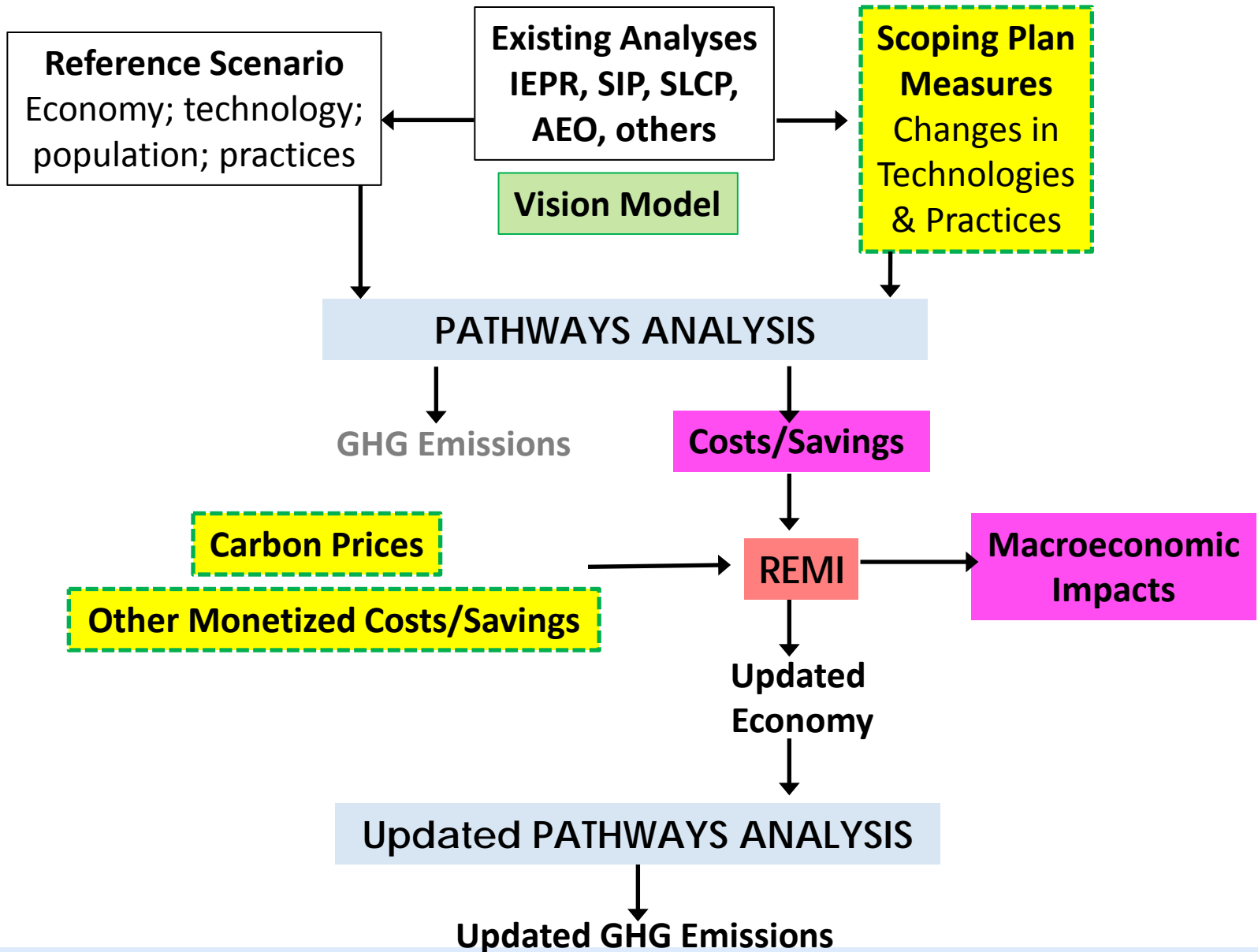




# SCOPING PLAN ECONOMIC ANALYSIS



# SCOPING PLAN ECONOMIC ANALYSIS



# Scoping Plan Measure Updates

- Scenario and measure updates impact costs and savings from PATHWAYS
- Costs have been added for measures
  - Update since November 7 Scoping Plan workshop
  - Capital and incentive costs have been added for 7 measures

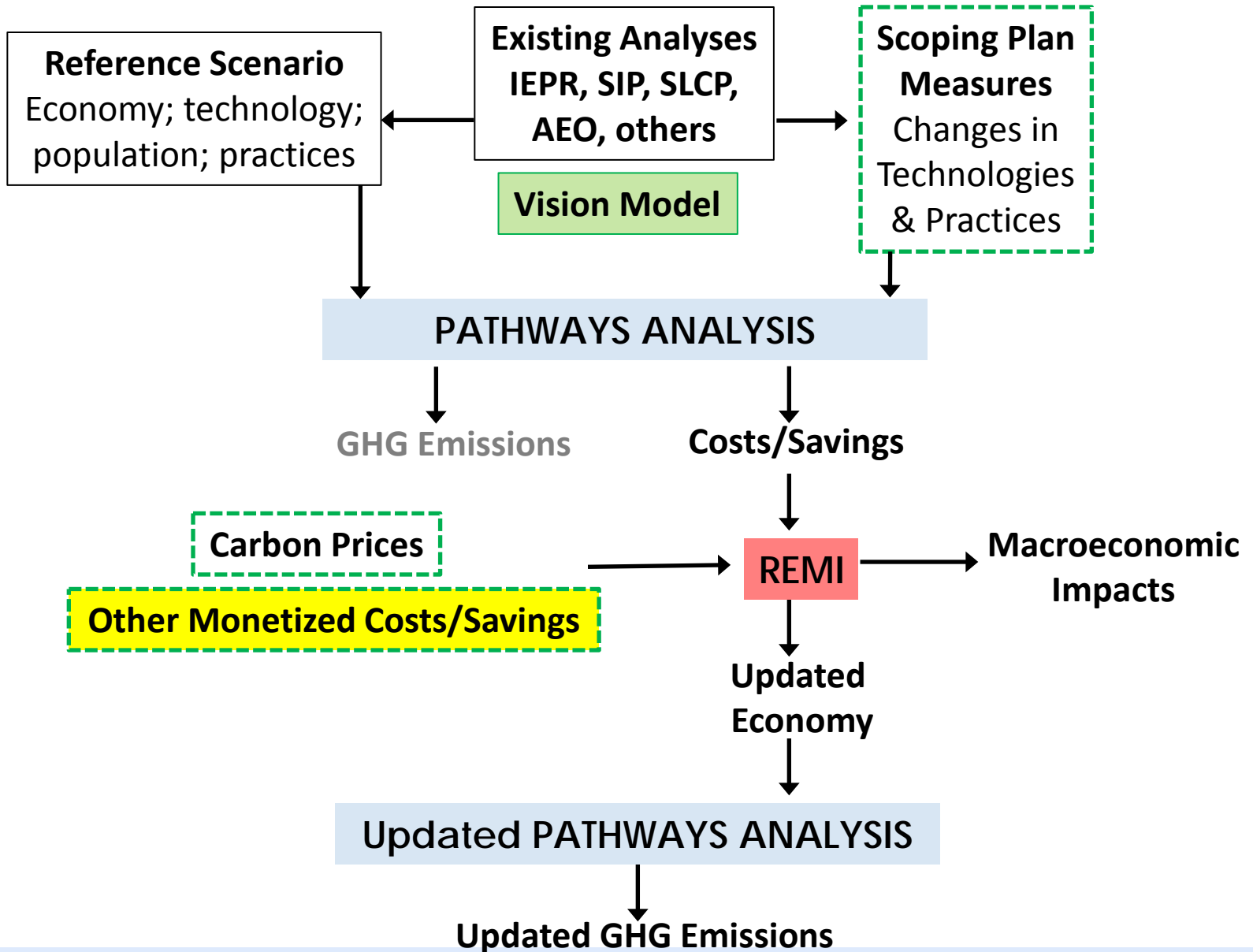
Sector	Measure	Scenario
Industrial	25% reduction in energy demand by 2030	Alt. 1
Oil & Gas	25% reduction in energy demand by 2030	Alt. 1
Refining	20% reduction in GHGs by 2030	All
Transportation	SB 375 VMT reductions	All
Transportation	Off-Road efficiency improvements	All
Transportation	Early retirement of LDV	Alt.1
Residential/ Commercial	Conservation and Behavior Change	All
Residential/ Commercial	Early retirement of R&C space heating & air conditioning	Alt. 1
Electricity	Flexible loads and workplace charging	All

# Zero Cost Measures

- ▣ Zero cost emission reductions
  - ▣ Result from conservation, behavior change, or reduced output
  - ▣ Associated with responses to dynamic price signals
- ▣ Emissions reductions with a cost
  - ▣ Driven by investments in efficiency or capital expenditures

Sector	Measure	Scenario
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# SCOPING PLAN ECONOMIC ANALYSIS

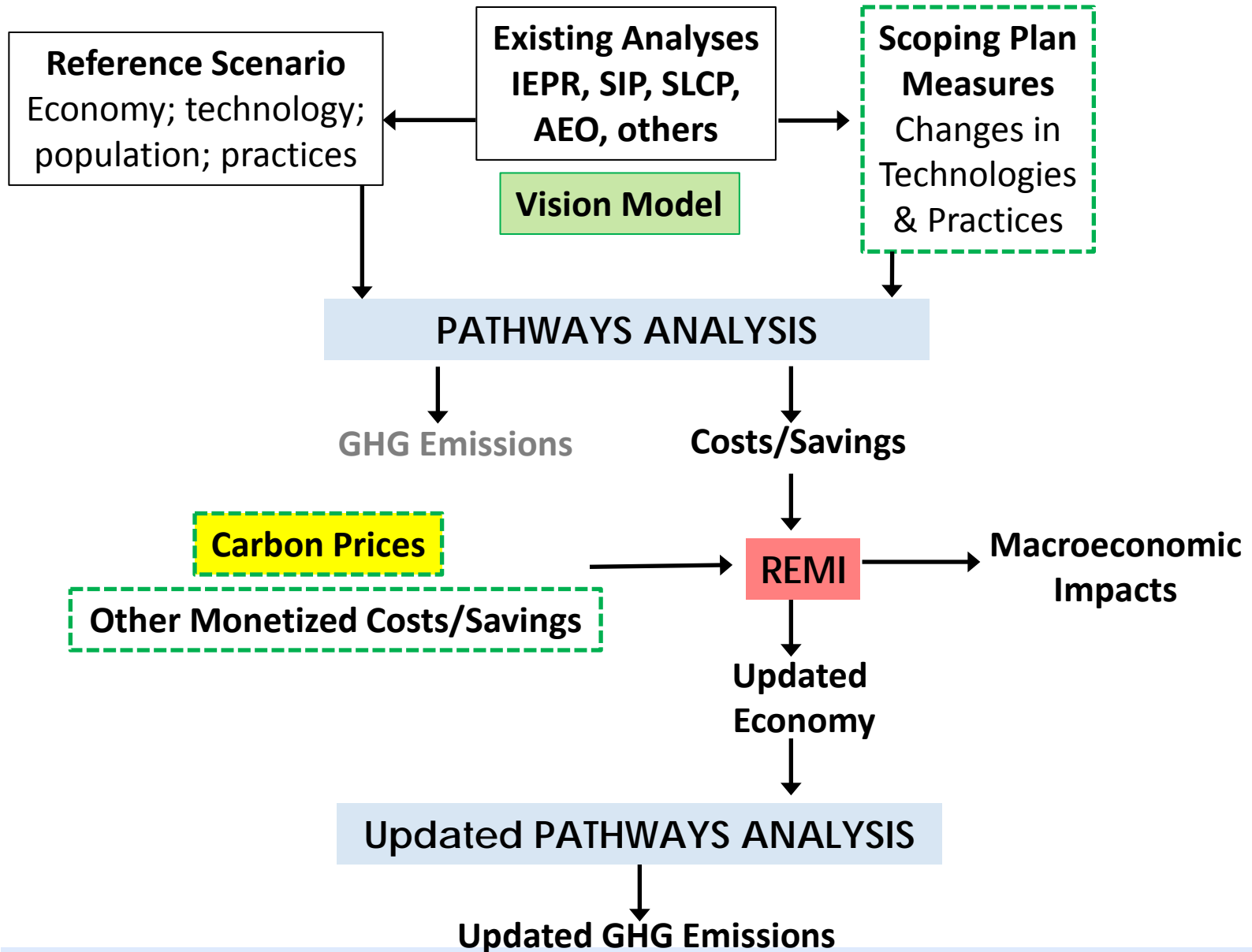


# Other Monetized Costs/Savings

- ▣ Impact on natural and working lands
  - ▣ NWL sector modeling workshop Dec 14, 2016
  - ▣ LBNL landscape carbon accounting tool
  - ▣ Working to incorporate impact on NWL into modeling
- ▣ Human and ecosystem health
  - ▣ AB 197 ranges of criteria and toxic emissions are not monetized for inclusion
  - ▣ Social costs are not included in the economic modeling
  - ▣ These impacts may be included in future Scoping Plans



# SCOPING PLAN ECONOMIC ANALYSIS



# Carbon Pricing

## ▣ Cap-and-Trade allowance price

- ▣ Range from auction price floor to Allowance Price Containment Reserve (APCR)

\$2015	2020	2025	2030
Floor	\$ 15.40	\$ 19.70	\$ 25.20
Reserve	\$ 72.10	\$ 79.70	\$ 85.20

## ▣ Carbon tax

- ▣ Social cost of carbon (currently around \$36 in \$2007)

\$2015	2020	2025	2030
3% discount	\$ 48.01	\$52.58	\$ 57.16

# Carbon Price Modeling

- ▣ Estimate annual emissions obligation of covered sectors
- ▣ Adjust firm production costs to incorporate carbon price to cover annual emissions
  - ▣ Under Cap-and-Trade (SP scenario)
    - ▣ Allowance allocation for competitiveness and consumer protection
    - ▣ Return of value through GGRF
    - ▣ Cost containment provisions
    - ▣ Uncertainty in allowance price - high certainty in reductions
  - ▣ Under carbon tax (Alternative 2)
    - ▣ High certainty in price – uncertainty in reductions

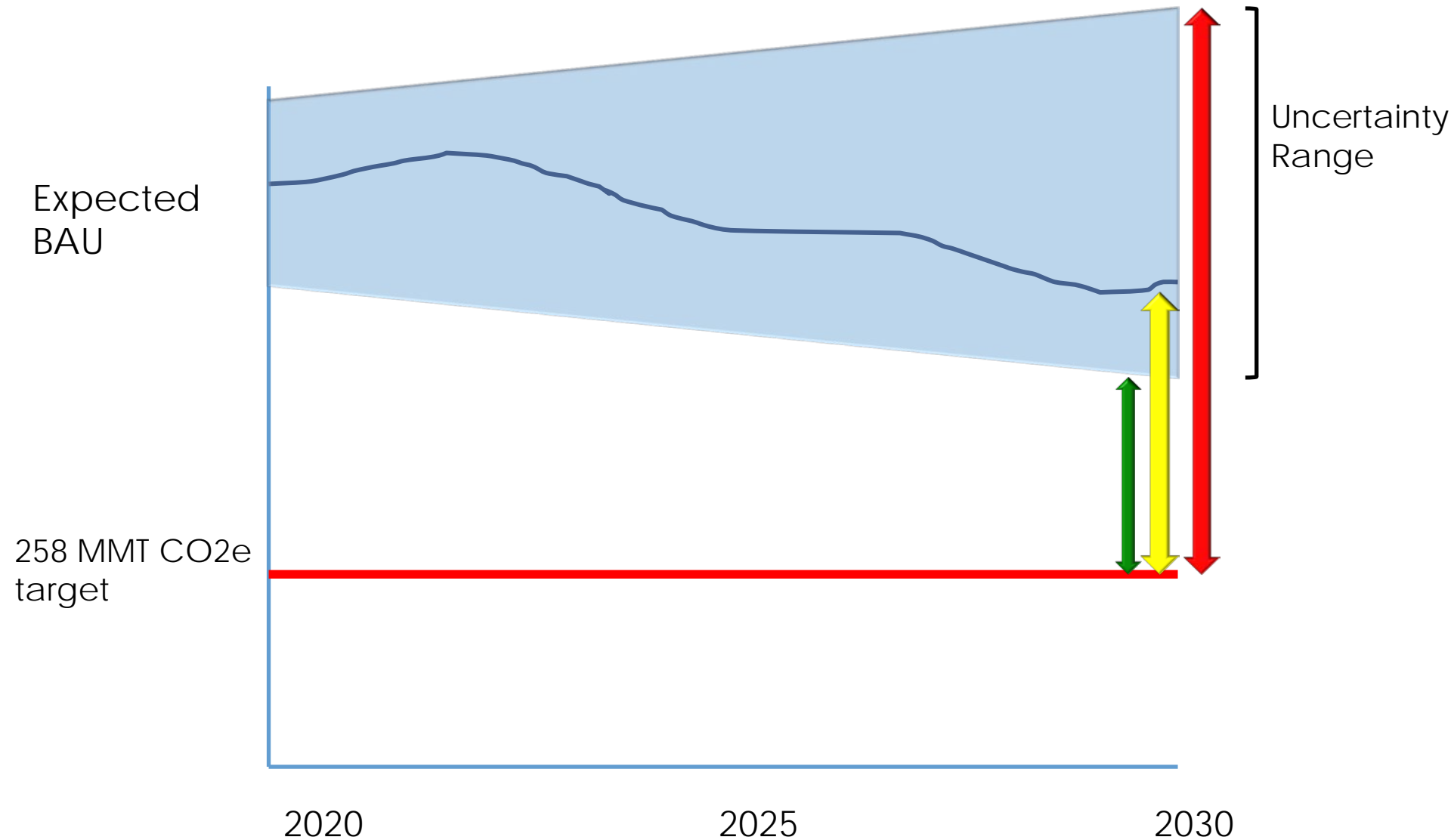
# Carbon Tax

- ▣ Tax structure unknowns
  - ▣ Achieving the SB 32 GHG target
    - ▣ Adjustable tax if reductions are higher/lower than anticipated
    - ▣ Additional direct measures if reductions are not realized
  - ▣ Assistance to minimize leakage and ensure California competitiveness
  - ▣ Distribution of tax revenue
  - ▣ Linkage with existing and potential partners

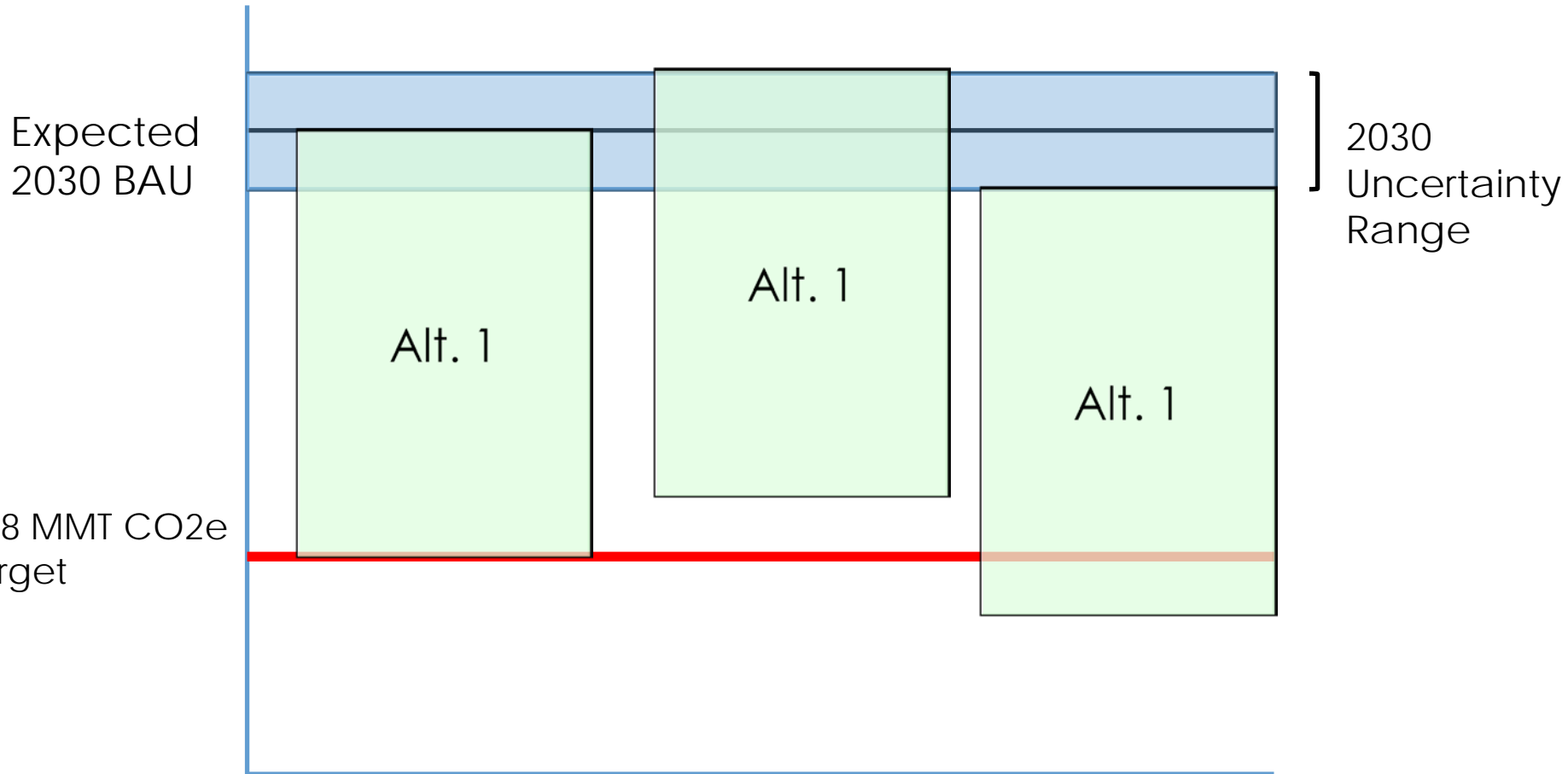
# Uncertainty

- ▣ Reference case or 'business as usual' GHG baseline
  - Revision of 2020 emissions baseline
    - ▣ 2008 Scoping Plan 596 MMTCO<sub>2</sub>e baseline in 2020 was revised to 545 MMTCO<sub>2</sub>e
    - ▣ 8 % reduction due to unanticipated economic downturn
- ▣ Measure (and scenario) emission reductions
  - ▣ Range of uncertainty across measures
- ▣ Measure (and scenario) cost
  - ▣ Range of uncertainty across measures

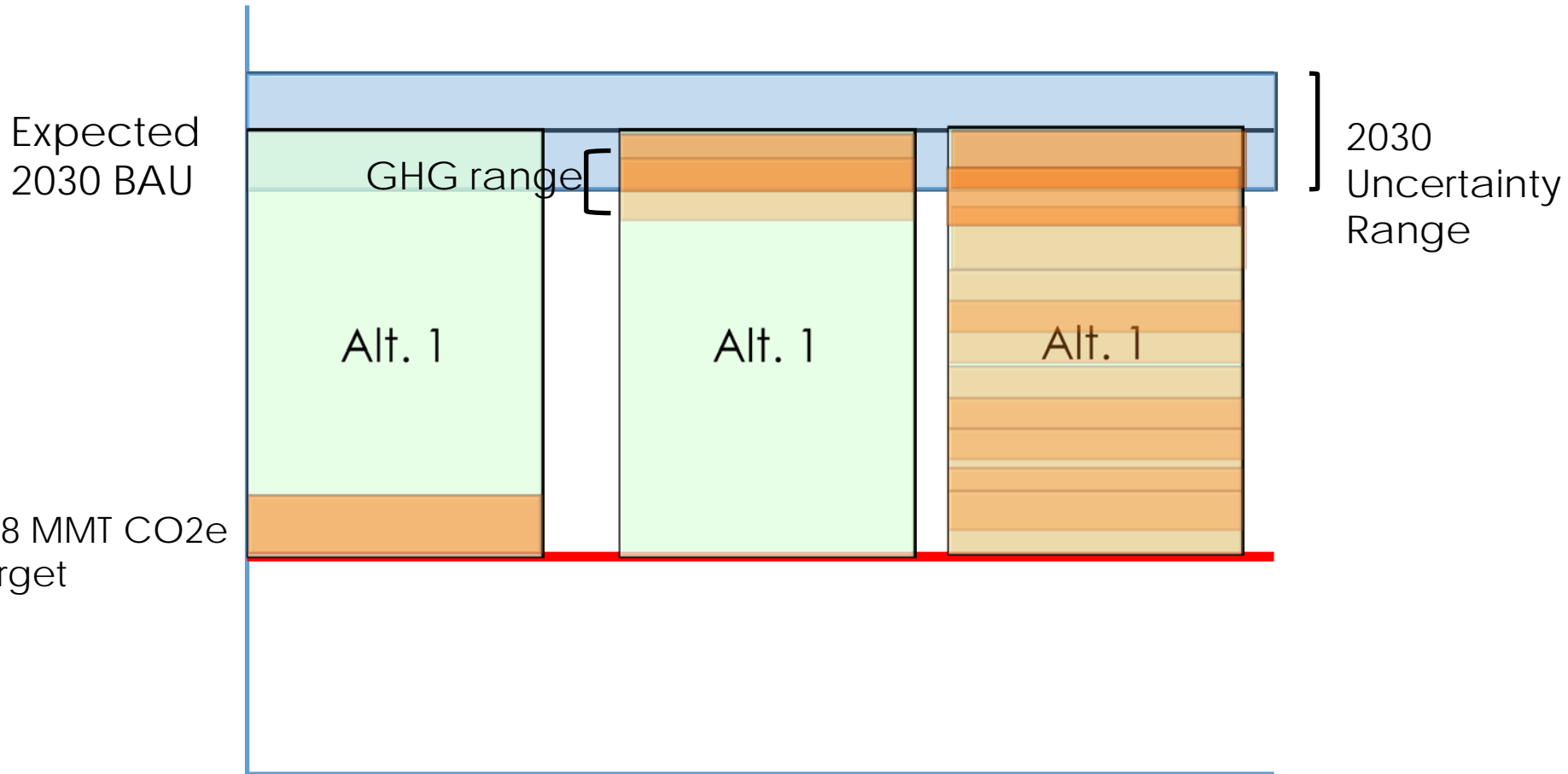
# Reference Case Uncertainty



# 2030 Uncertainty Example: Alt. 1

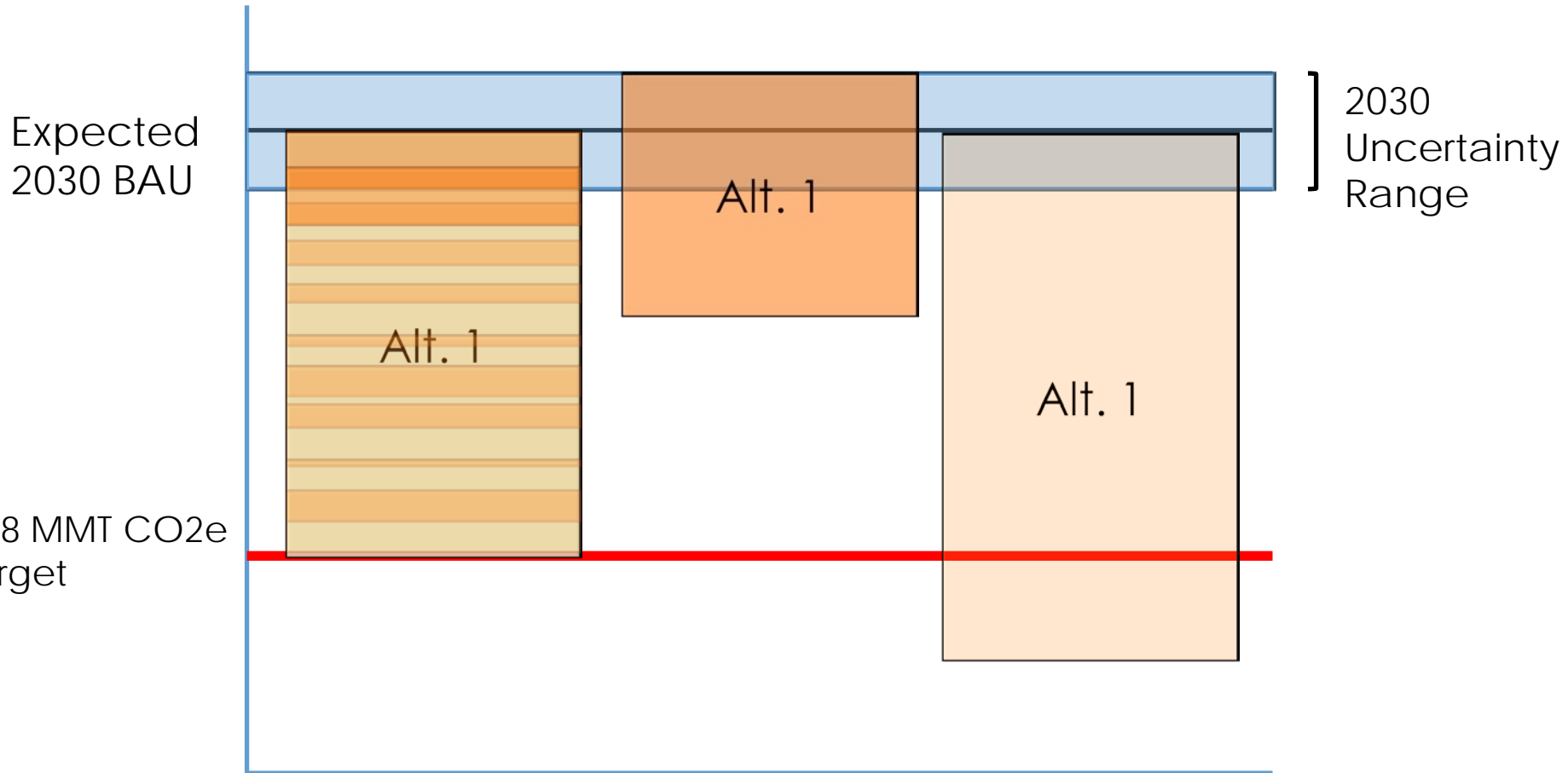


# 2030 Uncertainty Example: Alt. 1

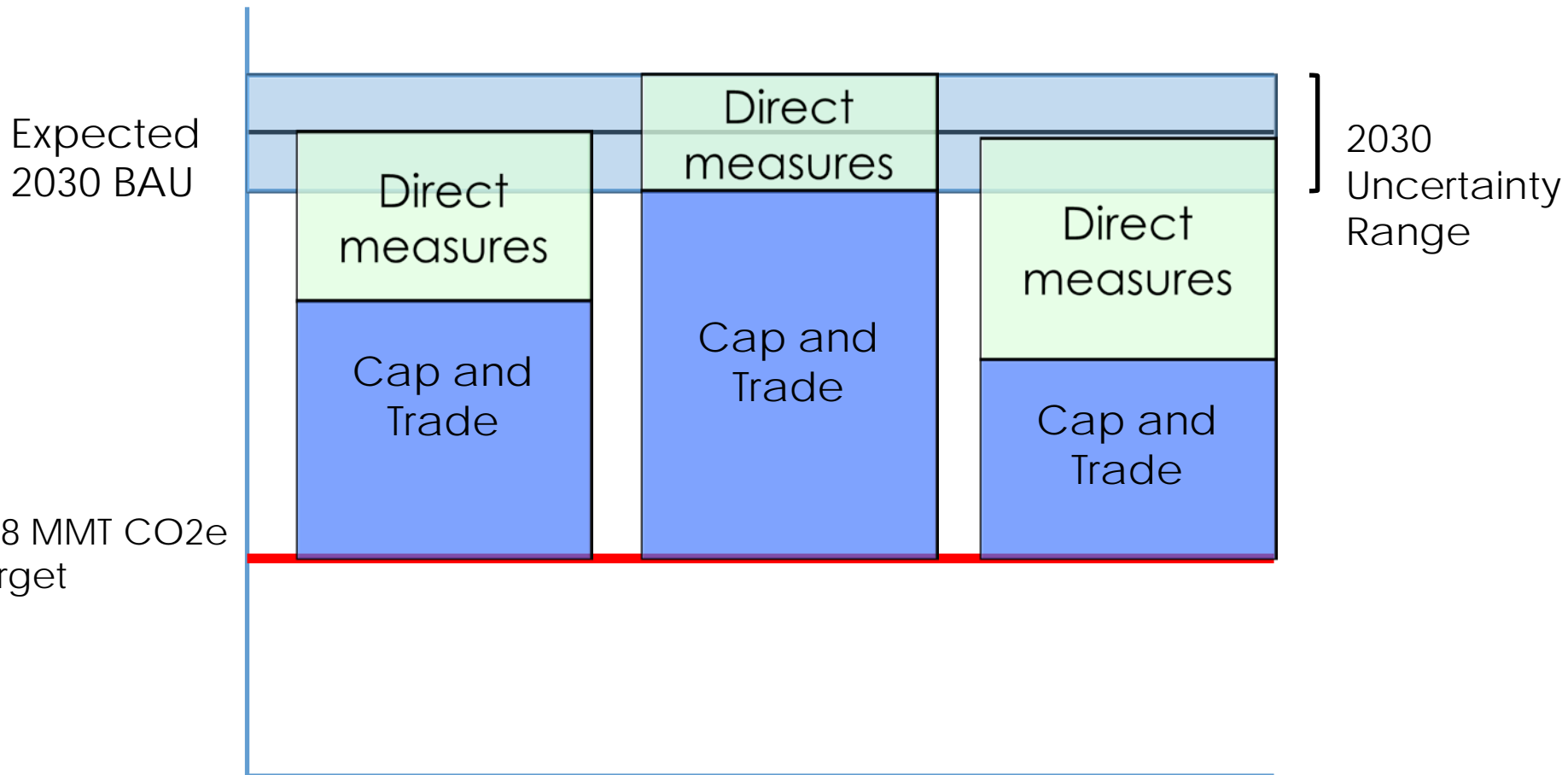




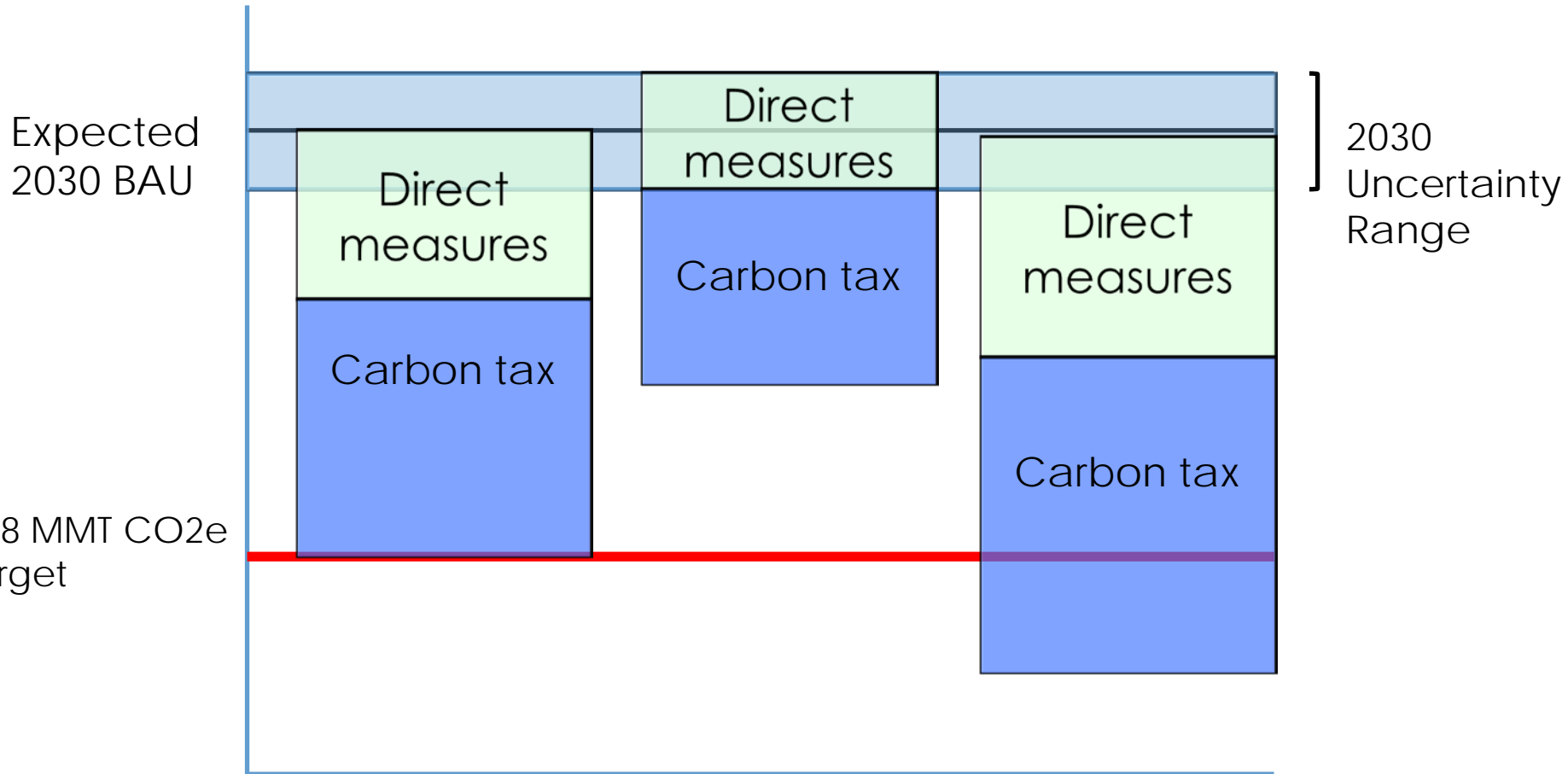
# 2030 Uncertainty Example: Alt. 1



# 2030 Uncertainty Example: Draft Scoping Plan Scenario



# 2030 Uncertainty Example: Alt. 2



# Next Steps

- ▣ Finalizing modeling results for the January draft of the 2030 Target Scoping Plan
  - ▣ Carbon pricing
  - ▣ Monetized impact on natural and working lands
- ▣ Evaluating the economic impact of scenarios
  - ▣ Direct cost and savings
  - ▣ Macroeconomic impact
  - ▣ Impact on disadvantaged communities
- ▣ Policy assessment of scenarios
  - ▣ Context of uncertainty
  - ▣ Ability to meet policy criteria outlined by California agencies

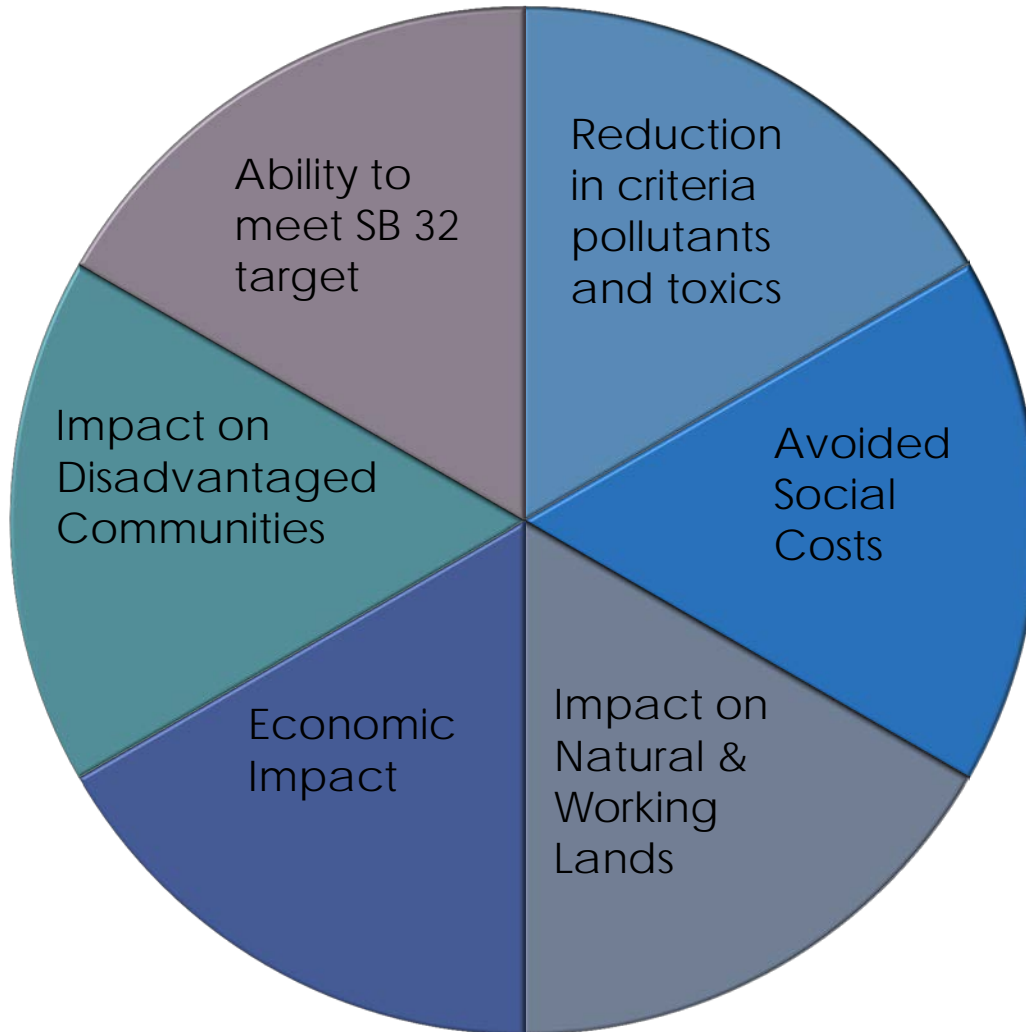
# Context of Economic Impact

- Under the reference case, the California economy is anticipated to grow from 2020 through 2030
  - Employment
    - Average growth of 0.2% per year
    - Estimated 23.5 million jobs in CA in 2030
  - State GDP
    - Average growth of 2.3% per year
    - Estimated \$3.4 trillion CA economy in 2030
- Economic impact of the scenarios is evaluated against the reference case
  - Draft results show the California economy and employment continue to grow under all scenarios
  - Any impact will be measured as a slowing or an acceleration of growth
  - No scenario is anticipated to result in zero or negative growth of the CA economy

# Policy Assessment

- ▣ Ability to reduce GHGs to meet SB 32 target
- ▣ Estimated range of reductions in criteria pollutants and toxics
- ▣ Evaluation of avoided social cost
- ▣ Impact on disadvantaged communities
- ▣ Impact on natural and working lands
- ▣ Estimated economic impact

# Policy Assessment



# Schedule

- Mid-January 2017: Release full Draft Scoping Plan with all appendices, economic and environmental analyses
- January Board Hearing on full Draft Scoping Plan
- First quarter 2017: Release final Scoping Plan
- Spring 2017: Final Board consideration