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

E-mail address for online audience questions:  
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
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

Emissions to be Reduced by 2020

Additional Reductions by 2030

Additional Reductions by 2050

*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 (EJ AC)**
  - 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
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
Reference Scenario

- 2030 GHG emissions estimated to be ~301 MMTCO2e 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
**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 of 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
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

Reference Scenario
Economy; technology; population; practices

Existing Analyses
IEPR, SIP, SLCP, AEO, others

Vision Model

Scoping Plan Measures
Changes in Technologies & Practices

Pathways Analysis

GHG Emissions

Carbon Prices
Other Monetized Costs/Savings

REMI

Updated Economy

Updated Pathways Analysis

Costs/Savings

Updated GHG Emissions

Macroeconomic Impacts
**Scoping Plan Economic Analysis**

- **Reference Scenario**
  - Economy; technology; population; practices

- **Existing Analyses**
  - IEPR, SIP, SLCP, AEO, others

- **Vision Model**

- **Scoping Plan Measures**
  - Changes in Technologies & Practices

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**Pathways Analysis**

- **GHG Emissions**
- **Costs/Savings**

- **Carbon Prices**
- **Other Monetized Costs/Savings**

- **REMI**

- **Updated Economy**

- **Updated Pathways Analysis**

- **Updated GHG Emissions**

- **Macroeconomic Impacts**
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
<table>
<thead>
<tr>
<th>Sector</th>
<th>Measure</th>
<th>Scenario</th>
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<tbody>
<tr>
<td>Industrial</td>
<td>25% reduction in energy demand by 2030</td>
<td>Alt. 1</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>25% reduction in energy demand by 2030</td>
<td>Alt. 1</td>
</tr>
<tr>
<td>Refining</td>
<td>20% reduction in GHGs by 2030</td>
<td>All</td>
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<tr>
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<td>SB 375 VMT reductions</td>
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<td>Early retirement of R&amp;C space heating &amp; air conditioning</td>
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<td>Flexible loads and workplace charging</td>
<td>All</td>
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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
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Scoping Plan Economic Analysis

- Reference Scenario: Economy, technology, population, practices
- Existing Analyses: IEPR, SIP, SLCP, AEO, others
- Vision Model

PATHWAYS ANALYSIS

- GhG Emissions
- Costs/Savings
- Carbon Prices
- Other Monetized Costs/Savings

REMI

- Updated Economy
- Macroeconomic Impacts

Updated PATHWAYS ANALYSIS

- Updated GhG Emissions
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**

- Reference Scenario
  - Economy; technology; population; practices

- Existing Analyses
  - IEPR, SIP, SLCP, AEO, others

- Vision Model

- Scoping Plan
  - Measures
  - Changes in Technologies & Practices

**Pathways Analysis**

- GHG Emissions
- Costs/Savings

- Carbon Prices
- Other Monetized Costs/Savings

- REMI
  - Updated Economy

- Updated Pathways Analysis
  - Updated GHG Emissions

- Macroeconomic Impacts
## Carbon Pricing

- **Cap-and-Trade allowance price**
  - Range from auction price floor to Allowance Price Containment Reserve (APCR)

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<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
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<tr>
<td>Floor</td>
<td>$15.40</td>
<td>$19.70</td>
<td>$25.20</td>
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<tr>
<td>Reserve</td>
<td>$72.10</td>
<td>$79.70</td>
<td>$85.20</td>
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</table>

- **Carbon tax**
  - Social cost of carbon (currently around $36 in $2007)

<table>
<thead>
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<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
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<td>3% discount</td>
<td>$48.01</td>
<td>$52.58</td>
<td>$57.16</td>
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</tbody>
</table>
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 MMTCO2e baseline in 2020 was revised to 545 MMTCO2e
    - 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

Expected BAU

258 MMTCO2e target

2020  2025  2030

Uncertainty Range
2030 Uncertainty Example: Alt. 1

Expected 2030 BAU

Alt. 1

Alt. 1

Alt. 1

2030 Uncertainty Range

258 MMT CO2e target
2030 Uncertainty Example: Alt. 1

Expected 2030 BAU

258 MMTCO2e target

GHG range

Alt. 1

Alt. 1

Alt. 1

2030 Uncertainty Range
2030 Uncertainty Example: Alt. 1

Expected 2030 BAU

258 MMT CO2e target

Alt. 1

Alt. 1

Alt. 1

2030 Uncertainty Range
2030 Uncertainty Example: Draft Scoping Plan Scenario

Expected 2030 BAU

258 MMT CO2e target

Direct measures

Cap and Trade

Direct measures

Cap and Trade

Direct measures

Cap and Trade

2030 Uncertainty Range
2030 Uncertainty Example: Alt. 2

- Expected 2030 BAU
  - Direct measures
    - Carbon tax
  - Direct measures
    - Carbon tax

258 MMTCO2e target
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

- Ability to meet SB 32 target
- Reduction in criteria pollutants and toxics
- Avoided Social Costs
- Impact on Natural & Working Lands
- Impact on Disadvantaged Communities
- Economic Impact
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