Document Overview

• Chapter 1: introduction to climate change & AB32
• Chapter 2: introduction to HIA and stakeholder process
• Chapter 3: aggregate statewide health impacts
• Chapter 4: potential impacts from offset protocols
• Chapter 5: community vulnerabilities & opportunities
• Chapter 6: recommendations & mitigations
Introduction

• Climate change is a public health threat: need for mitigation & adaptation strategies

• Discussion of health equity and the protection of vulnerable communities

• AB32 drives ARB to maximize co-benefits & ensure activities do not disproportionately impact low-income communities

• Use HIA to highlight potential health risks and maximize health benefits associated with cap-and-trade
HIA Process

• **Screening**: decision within the PHWG in Fall of 2009 to perform this HIA

• **Scoping**: public meetings to discuss health pathways of greatest interest for HIA

• **Assessment**: CDPH assessed potential health effects using data from ARB’s *Updated Economic Analysis of the Scoping Plan* from April 2010

• **Recommendations**: core findings and subsequent mitigation strategies

• **Reporting**: PHWG meetings and final report
Implementation of Cap-and-Trade

Policy Change

Program Design
- Cap
- Allowance allocation
- Use of offsets
- Trading / banking
- Revenue distribution

Health Determinants

1. Air pollution*
2. Employment
3. Energy costs
4. Offset co-benefits & impacts
5. Proceeds & revenue use

Intermediate Outcomes

Assessed by ARB
- Employment shifts by sector
- Jobs created / lost
- Changes in income
- Changes in AC / energy use
- Encourages energy efficiency
- Spending shifts

Health Outcomes

- Air related health impacts
- Changes in workplace morbidity
- Health care access
- Stress & well-being
- Income / expenditure shifts
- Heat-related mortality
- AQ related health outcomes
- Stress & well-being
- Income / expenditure shifts

Proceeds & revenue use

Broad depending on revenue distribution & use

Offset protocols & revenue use

Highly variable depending on specific offset protocol

Allowance price & offset limits

* Health determinant #1 and subsequent health pathways are the foundation of the health assessment led by ARB. Health Determinants #2-5 are the basis of the Phase 2 HIA.
Aggregate Statewide Impacts

Change in Labor Demand
- Employment shifts by sector
- Jobs created / shed
- Changes in income

Health Impacts
- Changes in workplace injury / illness
- Change in uninsured rates
- Impacts on stress & well-being
- Changes in household income

Change in Energy Costs
- Changes in household budgets
- Decrease AC/heat use; utility shut-off
- Energy conservation

Health Impacts
- Spending shifts on basic household needs, such as transportation, shelter, and nutritious foods
- Heat & cold-related morbidity/mortality
- Improvements in air quality
## Aggregate Statewide Impacts

<table>
<thead>
<tr>
<th>Business as Usual</th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cap-&amp;-trade program and Scoping Plan is not implemented</td>
<td>Cap-&amp;-trade&lt;br&gt;• 100% auction&lt;br&gt;• 49% emissions reductions can be offsets&lt;br&gt;• Unlimited banking/trading</td>
<td>Cap-&amp;-trade&lt;br&gt;• 100% auction&lt;br&gt;• No offsets&lt;br&gt;• Unlimited banking/trading</td>
</tr>
<tr>
<td></td>
<td>Complementary measures as included in Scoping Plan are achieved at 100%</td>
<td>Complementary measures as included in Scoping Plan are achieved at 100%</td>
</tr>
</tbody>
</table>

**Economic impacts of Case 1 & Case 2 are then compared the BAU scenario to judge potential health effects (data from ARB’s “Updated Economic Analysis of the Scoping Plan”)**
Employment & Health

• Health effects related to insurance, workplace morbidity/mortality, household stress and income

• Differential unemployment risks:
  - Low-educational attainment
  - Person of color
  - Youth aged 16-24 years

• Employment a strong health determinant, though many people’s health is seemingly resilient while unemployed
Employment & Health: Findings

Case 1
- Minimal change in job growth
- Some job shifts between sectors
- Potential for temporary employment disruptions
- Very small decrease in statewide job morbidity as jobs shift sectors

Case 2
- Reduced job growth compared to BAU (200k fewer jobs)
- Larger decreases in job morbidity, but largely due to job growth reductions

Summary
- Minor health effects are expected from job transitions
- Negative health effects can be readily mitigated with worker transition assistance
- Case 1 likely has fewer negative health effects related to labor shifts
Residential Fuel Costs & Health

• Utility cost concerns force many low-income families to cut back on basic household needs, such as:
  o Nutritious foods
  o Shelter
  o Education
  o Transportation

• Utility costs can impact AC use: a basic adaptation tool in heat waves, especially for vulnerable populations

• Increased utility costs can spur energy efficiency, reducing CO₂ emissions & improving air quality
Residential Fuel Costs & Health: Findings

- Low-income households spend disproportionate amount of income on utility costs

<table>
<thead>
<tr>
<th>Income quintile</th>
<th>Proportion of income</th>
<th>Proportion of all expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>2\textsuperscript{nd} Quintile</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>3\textsuperscript{rd} Quintile</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>4\textsuperscript{th} Quintile</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Highest</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Residential Fuel Costs & Health: Findings

• Low-income households have the least ability to adapt to rising costs with investments in home energy efficiency.

• Positive health effects expected from household investments in energy efficiency: maintain price incentives for households that can adapt to rising costs.

• Need to narrowly mitigate increases in home fuel costs: promote energy efficiency investments and energy cost subsidies in low-income households.
Offset Protocols

Scoping of potential health effects of 4 specific protocols

- Urban Forest compliance offset protocol
- Forest compliance offset protocol
- Ozone Depleting Substances compliance offset protocol
- Livestock Manure Digester compliance offset protocol

Diverse range of potential health effects

Common potential health effects include:

- Air quality
- Job creation
- Water quality
- Cardiovascular health (AQ & physical activity associated with green space)
# Offset Protocols: Findings

## Urban Forest Protocol

<table>
<thead>
<tr>
<th>Impact*</th>
<th>Health effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive AQ impact</td>
<td>CVD &amp; respiratory illness</td>
</tr>
<tr>
<td>Reduction in heat islands</td>
<td>Heat stroke; heat exhaustion; dehydration</td>
</tr>
<tr>
<td>Noise reduction</td>
<td>Hypertension, CVD, sleep disturbance</td>
</tr>
<tr>
<td>Greenspace</td>
<td>Access to physical activity</td>
</tr>
<tr>
<td>Improved water quality</td>
<td>Ecological &amp; health benefits</td>
</tr>
</tbody>
</table>

*Impacts can be either positive and negative.*
### Offset Protocols: Findings

<table>
<thead>
<tr>
<th>Impact</th>
<th>Health effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive AQ impact</td>
<td>CVD &amp; respiratory illness</td>
</tr>
<tr>
<td>Decreased landslide risk</td>
<td>Injury</td>
</tr>
<tr>
<td>Decreased erosion</td>
<td>Positive water quality benefits</td>
</tr>
<tr>
<td>Decreased UV exposure</td>
<td>Reduction in malignant melanomas; eye damage</td>
</tr>
<tr>
<td>Facility construction</td>
<td>Variable &amp; unknown at this time</td>
</tr>
<tr>
<td>Changes in AQ</td>
<td>Overall, likely positive</td>
</tr>
<tr>
<td>Improvements in water quality</td>
<td>Decrease in water-borne illness</td>
</tr>
</tbody>
</table>

- **Forest Protocol**
- **ODS Protocol**
- **Manure Digester**
Offset Protocols: Summary Findings

Overall, potential health effects for all offset protocols are expected to be net beneficial

Most near-term health effects will accrue locally (where the offset project is located): keeping positive offset projects in State will have health co-benefits in California

Promoting the most positive projects—such as urban forest projects—in vulnerable communities maximizes health co-benefits
Community Vulnerabilities & Opportunities

• Cannot predict community level health impacts with certainty

• Secondary approach to look at existing vulnerabilities in selected highly impacted communities

• Assess existing vulnerabilities to:
  o Inform mitigation strategies
  o Inform community investments to improve community’s adaptive capacities to environmental stressors and climate change
Community Vulnerabilities & Opportunities

3 Case Studies

1) Wilmington Community: local data from LA County Department of Public Health

2) City of Richmond: local data from Contra Costa Health Services

3) San Joaquin Valley (8 County area): data from CDPH and other health data resources
Community Case Studies: Findings

• Cannot predict community level health impacts with certainty
  o Local health data very limited
  o Difficulties in predicting local social/economic impacts

• Existing vulnerabilities are diverse
  o Air pollution
  o Crime
  o Access to neighborhood resources (parks, nutritious food, etc)
  o Cardiovascular health; diabetes; low-birth weight
  o Agricultural pollutants

• Existing health disparities consistent across geographies
  o Race
  o Income
  o Educational attainment
Community Case Studies: Findings

• Surveillance systems to assess local level impacts
  o Minimizes uncertainty
  o Integrate with other environmental & health surveillance programs
  o Ensure data is comprehensive, timely, and easily accessible

• Community investments likely the greatest source of positive health effects
  o Direct towards most vulnerable communities
  o Flexibility to fulfill diverse health needs
Community Case Studies: Findings

Community Health Investments

• Identify vulnerable/disadvantaged communities
• Community Health Assessments
  o Data & community engagement process
• Community health improvement grants
• Models:
  o Tobacco Control Program
  o HCR Community Transformation Grants
Summary Mitigations & Recommendations

• Negligible to minor health effects anticipated
  ○ Small effects from worker transitions
  ○ Negative impacts of residential energy costs disproportionately impact low-income communities

• Use of offsets benefit economic health determinants

• Offsets may reduce benefits of on-site emission reductions

• Offset projects in-State yield greatest health co-benefits for CA

• Community investments of allowance revenue likely the greatest source of positive health effects
Summary Mitigations & Recommendations

- Mitigation strategies:
  - Investment in worker transition programs (targeting impacted industries and vulnerable communities)
  - Home energy efficiency investments and direct subsidies as needed for low-income households
  - Target positive offset projects—such as urban forests—to California communities with an existing need
  - Target community investments to vulnerable communities
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