Public Health Working Group

August 23, 2017

Rye Baerg
Active Transportation and Special Programs
Welcome

- Name
- Agency or Organization
- Favorite place to walk or bike
2017 Working Group Outlook

- Summer/Fall 2017 – Listening Sessions
- Spring 2018 – Draft Public Health Framework
- Winter 2017/Spring 2018 – Local Input Process
- Spring 2019 – Official RTP/SCS Outreach
Regional Transportation Plan

- Integrated Land-Use and Transportation Plan
- Developed through “bottoms-up” process that respects city control
- Aims to meet state-adopted GHG reduction targets for 2020, 2035
- First RTP/SCS adopted April 2012
- 2016 RTP/SCS adopted April 2016
Public Health Framework

- Broad document summarizing Working Group Feedback
- Used for as a base for future outreach with regional stakeholders including sub-regions and county agencies
- Highlight focus areas for SCAG to begin early data collection and analysis
Listening Sessions

- Thematic review of focus areas in the plan
- Discussion of new possible analysis related to each area and identification of data needs
- Discussion of how the Health Analysis in the RTP/SCS can be improved as a planning tool for local jurisdictions and stakeholders
2016 RTP/SCS: Public Health Plan Analysis Focus Areas

- Physical Activity
- Affordable Housing
- Economic Opportunity
- Climate Adaptation
- Access
- Air Quality
- Transportation Safety

Public Health Appendix

Listening Session Schedule

- March – Economy and Housing
- August – Climate and Air Quality
- Winter – Access and Physical Activity
- Spring – Health Equity and Environmental Justice
- Spring – Draft Framework
## Performance Measures

<table>
<thead>
<tr>
<th>Relevant Performance Measures</th>
<th>Public Health Focus Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accessibility</td>
</tr>
<tr>
<td>Additional jobs supported by improving competitiveness</td>
<td>Regional Economic Model REMI</td>
</tr>
<tr>
<td>Additional jobs supported by transportation investments</td>
<td>Regional Economic Model REMI</td>
</tr>
<tr>
<td>Net contribution to Gross Regional Product</td>
<td>Regional Economic Model REMI</td>
</tr>
<tr>
<td>Criteria pollutants and greenhouse gas emissions</td>
<td>Travel Demand Model/WEW EMWAC Model</td>
</tr>
<tr>
<td>Share of growth in High Quality Transit Areas (HQTA)</td>
<td>RTF/SCS socio-economic small area data</td>
</tr>
<tr>
<td>Average distance for work and non-work trips</td>
<td>Travel Demand Model</td>
</tr>
<tr>
<td>Percent of trips less than 3 miles</td>
<td>Travel Demand Model</td>
</tr>
<tr>
<td>Work Trip Length Duration</td>
<td>Travel Demand Model</td>
</tr>
<tr>
<td>Land Consumption</td>
<td>Scenario Planning Model</td>
</tr>
<tr>
<td>Mode share of walking and bicycling</td>
<td>Travel Demand Model</td>
</tr>
</tbody>
</table>
## Air Quality

<table>
<thead>
<tr>
<th>Metric</th>
<th>Result of Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution-related health incidences (annual)</td>
<td>270,328</td>
</tr>
<tr>
<td></td>
<td>234,363</td>
</tr>
<tr>
<td>Air pollution-related health costs (annual)</td>
<td>$4.5 Billion</td>
</tr>
<tr>
<td></td>
<td>$3.9 Billion</td>
</tr>
<tr>
<td>Share of New Growth within 500 Feet of Freeway</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>4.4%</td>
</tr>
<tr>
<td>Criteria pollutant and greenhouse gas emissions</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>-8% in 2020 - 19% in 2035 - 21% in 2040</td>
</tr>
</tbody>
</table>

*Please see the Performance Measures Appendix for more information on data sources and methodology used to calculate these outcomes.*
## Climate Adaptation

### TABLE 7 Plan Performance - Climate Adaptation*

<table>
<thead>
<tr>
<th>Metric</th>
<th>Result of Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2040 Baseline</td>
<td>2040 Plan</td>
</tr>
<tr>
<td>Criteria pollutant and greenhouse gas emissions from 2005 levels</td>
<td>N/A</td>
</tr>
<tr>
<td>Building Water Use, cumulative (2012-2040) compared to Baseline</td>
<td>134 million Acre Feet</td>
</tr>
<tr>
<td>Land Consumption (Greenfield land consumed in square miles)</td>
<td>154</td>
</tr>
</tbody>
</table>

*Please see the Performance Measures Appendix for more information on data sources and methodology used to calculate these outcomes.
Rye Baerg
baerg@scag.ca.gov
Criteria Air Pollutants

What Are Criteria Air Pollutants?

- Criteria air pollutants are the six common air pollutants for which the U.S. Environmental Protection Agency (EPA) sets national ambient air quality standards as required by the Federal Clean Air Act.
- The six criteria air pollutants are: ground-level ozone, particulate matter (PM2.5 & PM10), carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide.

What Does SCAG Report On?

- RTP/SCS and FTIP Transportation Conformity Analysis: emissions by nonattainment or maintenance areas
- RTP/SCS EJ Analysis: TAZ level emissions
- RTP/SCS PEIR: Regional total emissions
Regional Emission Modeling/Analysis

- Highway Network
- Transit Network
- External Trips
- Airport/Seaport Trips

SCAG’s Regional Travel Demand Model (TransCAD)
- VMT, VHT, Delay, Speed
- Link Volume
- OD Matrix

ARB’s Emission Factors Model (EMFAC)

Emissions of Criteria Pollutants and CO2 by County and Air Basin by Season

RTP/SCS and FTIP Transportation Conformity Analysis
RTP/SCS Environmental Justice Appendix
RTP/SCS PEIR
Interagency Collaboration

SCAG
Adopted RTP/SCS & FTIP

Travel Activity Projections

Scocioeconomic Growth Forecast

RTP/SCS and Transportation Control Measures (Appendix IV-C)

SCAG

SCAQMD (lead agency)
ARB
SCAG

South Coast Air Quality Management Plan (AQMP)

New Conformity Budgets (Caps on Emissions of Criteria Pollutants Emission)

SCAG
New RTP/SCS & FTIP
2016 RTP/SCS Performance Monitoring

Public Health Working Group
August 23, 2017
Performance-Based Planning

• MAP-21 (2012) established a legislative foundation for a national performance-based transportation planning program.

• The FAST Act (2015) continued the performance monitoring requirements outlined in MAP-21.

• State DOTs & MPOs are required to establish performance targets supportive of national transportation goals.

• Recently finalized federal rule-making established a set of national performance measures & guidelines for setting MAP-21 performance targets.
MAP-21 established federal transportation performance measures within (7) planning areas:

1) National Highway System (NHS) Performance
2) Freight Movement
3) CMAQ Program
4) Highway Safety
5) Pavement & Bridge Condition
6) Transit Asset Management
7) Public Transportation Safety
RTP/SCS Performance Monitoring

- In addition to federal MAP-21 performance monitoring requirements, SCAG is developing a program to evaluate regional implementation of the 2016-2040 RTP/SCS.

- The 2016 RTP/SCS is expected to result in significant benefits to the SCAG region with respect to mobility, accessibility, air quality, economic growth, public health & community sustainability.

- The RTP/SCS employs various performance measures to monitor progress being made toward meeting identified regional goals.

- SCAG’s on-going performance monitoring program also addresses federal air quality & Environmental Justice requirements & state greenhouse gas reduction mandates.
## 2016 RTP/SCS Goals

<table>
<thead>
<tr>
<th>Goal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Align Plan investments &amp; policies</td>
<td>Align investments &amp; policies with improving regional economic development &amp; competitiveness</td>
</tr>
<tr>
<td>Maximize mobility &amp; accessibility</td>
<td>Maximize mobility &amp; accessibility for all people &amp; goods in the region</td>
</tr>
<tr>
<td>Ensure travel safety &amp; reliability</td>
<td>Ensure travel safety &amp; reliability for all people &amp; goods in the region</td>
</tr>
<tr>
<td>Preserve &amp; ensure a sustainable transportation system</td>
<td>Preserve &amp; ensure a sustainable regional transportation system</td>
</tr>
<tr>
<td>Maximize the productivity of the transportation system</td>
<td>Maximize the productivity of our transportation system</td>
</tr>
<tr>
<td>Protect the environment &amp; health of residents</td>
<td>Protect the environment &amp; health of our residents by improving air quality &amp; encouraging active transportation, such as bicycling &amp; walking</td>
</tr>
<tr>
<td>Actively encourage &amp; create incentives</td>
<td>Actively encourage &amp; create incentives for energy efficiency, where possible</td>
</tr>
<tr>
<td>Encourage land use &amp; growth patterns</td>
<td>Encourage land use &amp; growth patterns that facilitate transit &amp; non-motorized transportation</td>
</tr>
<tr>
<td>Maximize system security</td>
<td>Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, &amp; coordination with other security agencies</td>
</tr>
</tbody>
</table>
The performance measures developed to support implementation of the 2016 RTP/SCS are organized around 8 general outcome categories reflective of the RTP/SCS goals:

1) Location Efficiency
2) Mobility & Accessibility
3) System Reliability
4) System Productivity
5) Transportation System Sustainability
6) Environmental Quality
7) Resource Efficiency
8) Public Health & Safety
Public Health Performance Measures

Public Health & Safety

- Collision rates by severity by mode
- Collision severity by mode (fatalities & serious injuries)
- Air pollution-related health measures
- Physical activity-related health measures
- Active transportation mode share (walking & biking)
Public Health Performance Measures

**Environmental Quality**
- Criteria pollutants emissions (CO, NOX, PM2.5, PM10, & VOC)
- Greenhouse gas (GHG) emissions

**Location Efficiency**
- Vehicle Miles Traveled (VMT) per capita

**Environmental Justice**
- Accessibility to parks & natural lands
- Emissions impact analysis
- Air quality impacts along freeways & highly traveled corridors
- Climate vulnerability
Public Health Performance Measures

In addition to SCAG’s RTP/SCS performance measures, MAP-21 also includes performance metrics related to health & safety:

- On-road mobile source emissions (reductions due to CMAQ projects)
- Non-SOV mode share (bike, pedestrian, carpool, transit, telecommuting)
- Highway Safety (motor vehicle serious injuries & fatalities)
- Non-Motorized Safety (bicycle/pedestrian serious injuries & fatalities)

- Public Transit Safety*:
  - Transit system serious injuries & fatalities
  - Transit system safety incidents
  - Rate of transit service vehicle failure

* Final federal rule-making for Public Transit Safety is still pending
Thank You!

Contact:

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gainor@scag.ca.gov
Background on Environmental Justice

Fundamental Principles

- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

- U.S. Department of Transportation, An Overview of Transportation and Environmental Justice.
Background on Environmental Justice

- Title VI of the Civil Rights Act of 1964
- Executive Order 12898 (1994)
- US Department of Transportation Order (1997)
- Federal Highway Administration Order (1998)
- Memorandum: Implementing Title VI Requirements in Metropolitan and Statewide Planning (1999)
- FTA Circular 4703.1 on Environmental Justice (2012)
- SCAG’s Environmental Justice Compliance Procedures (2000)
- SCAG’s Public Participation Plan (2014)
Methodology/Analysis
Identifying EJ Population Groups

Minority:
- A person who is African American, Hispanic or Latino, Asian American, American Indian, Alaskan Native, Native Hawaiian and Other Pacific Islander

Low-Income:
- A person whose median income is at or below the Department of Health and Human Services (HHS) poverty guidelines

Other Groups:
- Non-English speakers, Households without vehicles, Population without a high school degree or equivalent, Disabled individuals, Seniors, ages 65 and over, Young children, ages 4 and under
Environmental Justice and Climate Vulnerability

- Climate change impacts everyone, but not all people equally.

- Racial and ethnic minority and lower income household tend to be more vulnerable because of fewer resources to cope with its effects.

- Others in the higher risks population are young children, seniors, and the chronically ill.
Climate Change Effect

- **Increases in ambient temperature/extreme heat conditions**
  - EJ populations have lower access than other population segments to common adaptation options including tree canopy (which provides shading and is correlated with a decreased urban heat island effect) and car ownership to access public cooling centers. The elderly, immigrant populations, and those in rural locations may have lower awareness of and access to cooling centers.

- **Increase in drought**
  - Reduced access to fresh fruit and vegetables, and even paying more for similar food products; and fewer job opportunities in sectors that employ significant proportions of low-income individuals including agriculture and tourism.
Climate Change Effect (Continued)

- **Increase frequency, intensity, and duration of extreme storms**
  - Flooding may cause serious health impacts and risks that include death and injury, contaminated drinking water, hazardous material spills, and increases in the populations of disease-carrying insects and rodents. Other negative impacts would include damage to critical infrastructure and community disruption/displacement. Indeed flooding may cause a range of detrimental physical, economic, and psychological effects for residents at risk, which are disproportionately minority and low income persons.
Projected coastal inundation areas in 2100, when the region’s sea level is modeled to reach 55 feet. Exposure to coastal flooding may cause a range of detrimental physical, economic and psychological effects on the populations impacted. Many of the areas affected fall outside EJAs or other areas of concern, but about 50,000 people are anticipated to be impacted from EJAs, and 48,000 in SB 535 Disadvantaged Communities (DACs). In regard to Communities of Concern (CoCs), there will slightly more than 3,000 people affected from the Harbor Gateway and Wilmington areas.
In the SCAG region, 57,000 housing units fall in these criteria out of nearly 6.4 million (less than one percent). This number is relatively small when compared with all housing units in the region, 51,000 of these substandard housing units are in Environment Justice Areas (89.3 percent).
High Fire Threat Areas

Large fires statewide are anticipated to increase from roughly 58 percent to 128 percent over the next several years, and the resulting burn areas will increase from 57 percent to 169 percent by 2085. As a result, air quality, water quality and perhaps food production and energy pricing will be affected. These extra costs are expected to more severely impact low-income communities.
## Population in High Fire Threat Areas

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>90,888</td>
<td>24%</td>
<td>138,011</td>
<td>25%</td>
<td>40,715</td>
<td>29%</td>
</tr>
<tr>
<td>White</td>
<td>204,559</td>
<td>54%</td>
<td>300,058</td>
<td>56%</td>
<td>77,406</td>
<td>54%</td>
</tr>
<tr>
<td>Minority</td>
<td>776,849</td>
<td>46%</td>
<td>246,110</td>
<td>44%</td>
<td>55,406</td>
<td>46%</td>
</tr>
<tr>
<td>African American</td>
<td>16,355</td>
<td>4%</td>
<td>21,620</td>
<td>4%</td>
<td>6,193</td>
<td>4%</td>
</tr>
<tr>
<td>Native American</td>
<td>983</td>
<td>0%</td>
<td>2,370</td>
<td>0%</td>
<td>1,046</td>
<td>1%</td>
</tr>
<tr>
<td>Asian</td>
<td>55,418</td>
<td>15%</td>
<td>65,941</td>
<td>12%</td>
<td>13,057</td>
<td>9%</td>
</tr>
<tr>
<td>Other Race</td>
<td>12,204</td>
<td>3%</td>
<td>18,150</td>
<td>3%</td>
<td>4,305</td>
<td>3%</td>
</tr>
<tr>
<td>Age 0 to 4</td>
<td>20,903</td>
<td>5%</td>
<td>32,337</td>
<td>5%</td>
<td>8,658</td>
<td>5%</td>
</tr>
<tr>
<td>Seniors (65+)</td>
<td>48,566</td>
<td>13%</td>
<td>64,159</td>
<td>12%</td>
<td>17,304</td>
<td>12%</td>
</tr>
<tr>
<td>Disabled</td>
<td>31,531</td>
<td>8%</td>
<td>45,114</td>
<td>0%</td>
<td>12,452</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>360,407</strong></td>
<td><strong>555,168</strong></td>
<td><strong>142,812</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty 1</td>
<td>12,064</td>
<td>10%</td>
<td>18,233</td>
<td>10%</td>
<td>4,953</td>
<td>11%</td>
</tr>
<tr>
<td>Poverty 2</td>
<td>8,600</td>
<td>7%</td>
<td>12,223</td>
<td>7%</td>
<td>3,471</td>
<td>7%</td>
</tr>
<tr>
<td>Poverty 3</td>
<td>8,073</td>
<td>7%</td>
<td>12,830</td>
<td>7%</td>
<td>3,581</td>
<td>8%</td>
</tr>
<tr>
<td>Quintile 1</td>
<td>18,773</td>
<td>15%</td>
<td>27,569</td>
<td>15%</td>
<td>7,536</td>
<td>16%</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>20,628</td>
<td>15%</td>
<td>30,599</td>
<td>17%</td>
<td>8,357</td>
<td>10%</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>23,919</td>
<td>19%</td>
<td>34,674</td>
<td>19%</td>
<td>9,174</td>
<td>20%</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>26,418</td>
<td>22%</td>
<td>41,364</td>
<td>23%</td>
<td>10,475</td>
<td>23%</td>
</tr>
<tr>
<td>Quintile 5</td>
<td>35,018</td>
<td>26%</td>
<td>49,613</td>
<td>27%</td>
<td>10,776</td>
<td>23%</td>
</tr>
</tbody>
</table>
Minority communities are disproportionately affected. Minorities comprise 71% of the population living in 100-year Flood Hazard Zones, and 77% of the population residing in a 500-year Flood Zones. This analysis also shows lower income households are disproportionately impacted. The poorest households, as well as the lowest quintile income households, have a larger concentration in flood hazard zones than in the greater region.
## Population and Household in Flood Hazard Areas

<table>
<thead>
<tr>
<th>Population</th>
<th>100-Year Flood Hazard Zone</th>
<th>Share of Population Living in 100-Year Zone</th>
<th>500-Year Flood Hazard Zone</th>
<th>Share of Population Living in 500-Year Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>8,793</td>
<td>53%</td>
<td>1,432,725</td>
<td>54%</td>
</tr>
<tr>
<td>White</td>
<td>4,873</td>
<td>29%</td>
<td>655,179</td>
<td>23%</td>
</tr>
<tr>
<td>Minority</td>
<td>11,888</td>
<td>71%</td>
<td>2,056,870</td>
<td>77%</td>
</tr>
<tr>
<td>African American</td>
<td>745</td>
<td>4%</td>
<td>186,160</td>
<td>7%</td>
</tr>
<tr>
<td>Native American</td>
<td>38</td>
<td>0%</td>
<td>7,645</td>
<td>0%</td>
</tr>
<tr>
<td>Asian &amp; PI</td>
<td>1,928</td>
<td>12%</td>
<td>375,515</td>
<td>14%</td>
</tr>
<tr>
<td>Other Race</td>
<td>367</td>
<td>2%</td>
<td>54,826</td>
<td>2%</td>
</tr>
<tr>
<td>Age 0 to 4</td>
<td>1,017</td>
<td>6%</td>
<td>194,267</td>
<td>7%</td>
</tr>
<tr>
<td>Seniors (65+)</td>
<td>2,157</td>
<td>13%</td>
<td>277,342</td>
<td>10%</td>
</tr>
<tr>
<td>Disabled</td>
<td>1,711</td>
<td>10%</td>
<td>250,931</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16,741</strong></td>
<td></td>
<td><strong>2,002,048</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Households</th>
<th>100-Year Flood Hazard Zone</th>
<th>Share of Households Living in 100-Year Zone</th>
<th>500-Year Flood Hazard Zone</th>
<th>Share of Households Living in 500-Year Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty 1</td>
<td>796</td>
<td>15%</td>
<td>102,862</td>
<td>13%</td>
</tr>
<tr>
<td>Poverty 2</td>
<td>466</td>
<td>0%</td>
<td>70,342</td>
<td>0%</td>
</tr>
<tr>
<td>Poverty 3</td>
<td>463</td>
<td>9%</td>
<td>69,198</td>
<td>9%</td>
</tr>
<tr>
<td>Quinlilite 1</td>
<td>1,134</td>
<td>21%</td>
<td>147,287</td>
<td>15%</td>
</tr>
<tr>
<td>Quinlilite 2</td>
<td>1,097</td>
<td>20%</td>
<td>164,490</td>
<td>21%</td>
</tr>
<tr>
<td>Quinlilite 3</td>
<td>1,054</td>
<td>20%</td>
<td>165,538</td>
<td>21%</td>
</tr>
<tr>
<td>Quinlilite 4</td>
<td>1,036</td>
<td>19%</td>
<td>160,903</td>
<td>21%</td>
</tr>
<tr>
<td>Quinlilite 5</td>
<td>1,070</td>
<td>20%</td>
<td>136,872</td>
<td>16%</td>
</tr>
</tbody>
</table>
# Impacts of Potential Adaptation Policies on EJ Populations

<table>
<thead>
<tr>
<th>Climate Adaptation Policy</th>
<th>Source</th>
<th>Spatial</th>
<th>Potential Impact on EJ Populations</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select materials/designs to improve road resiliency to high temperatures, and to reduce heat retention</td>
<td>State of California</td>
<td>New/reconstructed roads may run through vulnerable communities (-); investment could be prioritized for most vulnerable areas (+)</td>
<td>Higher cost treatments could divert funds from transit, other measures (-); could save costs in long term by avoiding need for reconstruction (+)</td>
<td>Noise impacts; air pollution impacts during construction and use (-); Reduce heat island impacts (+)</td>
</tr>
<tr>
<td>Fortify roadways vulnerable to storm surge and sea-level rise</td>
<td>City of Chula Vista, State of California</td>
<td>Roads may run through vulnerable communities (-); Could protect such communities, e.g. during evacuations (+)</td>
<td>Higher cost treatments could divert funds from transit, other measures (-); could save costs in long term by avoiding need for reconstruction (+)</td>
<td>Noise impacts; air pollution impacts during construction and use (-); Could improve safety (+)</td>
</tr>
<tr>
<td>Increasing shade trees</td>
<td>Western Rivers Council of Governments (WRCOG), City of Chula Vista</td>
<td>Investment could be prioritized for most vulnerable areas (+)</td>
<td>Funding greater availability of shade trees could divert funds from other measures (-); Shading can reduce cooling costs (+); Increased greening may increase greenerification/housing cost pressures (-)</td>
<td>Visual impacts (+); Reduction in ambient temperatures (+); Reduction in stress (+)</td>
</tr>
<tr>
<td>New sea level rise &amp; land development codes</td>
<td>City of Chula Vista</td>
<td>EJ populations communities near the Port of LA are particularly susceptible to sea level rise (-)</td>
<td>Costs to comply with new codes could make (new) housing developments less affordable (-); could save costs in long term by avoiding need for maintenance/reconstruction (+)</td>
<td>Could improve safety (+); could result in higher quality housing (+)</td>
</tr>
<tr>
<td>Reducing vehicle miles traveled (VMT) through taxes and fees, congestion pricing</td>
<td>WRCOG, City of San Diego, City of Toronto Public Health</td>
<td>EJ populations may have longer distances and commute time between home and work due to reduced housing purchasing power (-)</td>
<td>Increased costs may disproportionately affect EJ households (-); EJ populations may have less flexibility in changing times they travel to avoid charges (-); or incur additional travel costs by taking longer routes to avoid tolls (-); Could increase attraction of low-cost modes for EJ populations (+)</td>
<td>Increased personal exposure to heat and PM (-) but decreased regional exposure (+) would likely improve health conditions (e.g. cardiovascular, weight, Type II diabetes, respiratory) if mode switch to bike or walk (+)</td>
</tr>
<tr>
<td>Increasing availability of cooling centers</td>
<td>City of San Francisco, City of Toronto Public Health</td>
<td>Potential eases barriers (e.g. walkability) to accessing cooling centers, even if proximity increases (-)</td>
<td>Funding greater availability of cooling centers could divert funds from other measures (-); Could reduce high-cost emergency response visits (+)</td>
<td>Disease spread (-); Surge in use could create stressful environment (-); Could contribute to social capital (+); Avoidance of heat-related illnesses (+)</td>
</tr>
<tr>
<td>Prioritizing projects that protect key evacuation routes and modes</td>
<td>State of California</td>
<td>EJ populations may not have access to key routes and modes (-); Could improve infrastructure in EJ areas (+)</td>
<td>Costs of improvements could divert funds from other measures (-)</td>
<td>Noise and air pollution impacts during construction (-); Improved evacuation travel times, improved emergency response times (+)</td>
</tr>
</tbody>
</table>
The 2016 RTP/SCS and Climate Change

- The 2016 RTP/SCS helps reduce the impacts of climate change on the region, by reaching the region’s reduction targets under SB 375.

- The 2016 RTP/SCS anticipates a large share of growth to occur in small-lot single-family and multifamily housing that is targeted for infill locations within high quality transit areas.

- The RTP/SCS also reduces future development in areas that contain high quality plant and animal habitats, including parklands, natural lands, farmland and other natural resource areas.
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SCAG Public Health Working Group

Air Quality, Health, & Infill Development

August 23, 2017
Brian Moore, PhD.
California Air Resources Board

California Environmental Protection Agency

Air Resources Board
Outline

• Impacts of air pollution on health
• Current air quality
• Health impacts of air pollution
• Air pollution, land use, and transportation
• Recent and current ARB research
• Future of health related air pollution research
How does air pollution impact health?

- Simple question, complex answer

- Which pollutant?
  - Carbon Monoxide
  - Ozone
  - Particulate Matter
  - Nitrogen Dioxide
  - Sulfur Dioxide

- What exposure?
  - Short Term
  - Long Term

- What population?
  - Age
  - Pre-existing Disease
  - Socio-economic Status

- Which health outcome?
  - Premature Mortality
  - Hospitalizations
  - Disease Onset
  - Heart & Lung Function
Evaluating health impacts

toxicology
controlled human exposure
epidemiology

health impact
Health impacts of air pollution

**Particulate Matter**
- Premature mortality
- Heart & lung-related ED visits & hospitalizations
- Asthma symptoms & risk of asthma development
- Lung function growth reduction
- Risk of low birth weight & infant mortality

**Ozone**
- Respiratory-related ED visits & hospitalizations
- Decreased lung function
- Symptoms & onset of asthma
- Increased risk of respiratory & all-cause mortality

**Toxics**
- Increased cancer risk
PM2.5 trends in California

Design Value (µg/m³)


South Coast
San Diego

NAAQS = 12 µg/m³
Ozone trends in California

Year

South Coast
San Diego
San Joaquin Valley

NAAQS = 70 ppb
Cleaner air can reduce premature mortality

### Particulate Matter 2.5

<table>
<thead>
<tr>
<th>Area</th>
<th>Standard (µg/m³)</th>
<th>Premature Deaths* Avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles-South Coast Air Basin</td>
<td>15</td>
<td>386 (301 – 73)</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2135 (1670 – 2608)</td>
</tr>
<tr>
<td></td>
<td>5.8</td>
<td>4121 (3238 – 5012)</td>
</tr>
</tbody>
</table>

### Ozone

<table>
<thead>
<tr>
<th>Area</th>
<th>Standard (ppm)</th>
<th>Premature Deaths Avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles-South Coast Air Basin</td>
<td>70</td>
<td>319 (166 - 471)</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>365 (190 - 539)</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>411 (214 - 607)</td>
</tr>
</tbody>
</table>

*cardiopulmonary-related deaths
Cleaner air reduces cancer risk

Cumulative cancer rates for toxic air contaminants

Human exposure to air pollution

- Ambient
- Near-roadway
- Commute
- Indoor
What about near-roadway exposure?

Background

• Exhaust and non-combustion materials
• Speciation and composition of emissions
• Concentrations highly spatially variable
• No viable monitoring network

Research findings

• Markers of NRAP linked to health
  • Distance to roads
  • Traffic density
  • NO2 and EC
• UFP: Few epidemiologic studies
Active transport and health

**Background**

- Bicycling & walking for transport can reduce VMT and emissions
- Additional physical activity can also improve health
- What about increased AP exposure during active transport?
- Is “substitution” an issue?

**Research findings**

- “Walkable” neighborhoods associated with decreased VMT
- Benefits may outweigh impacts of increased air pollution exposure
- Substitution may not be a big issue
- Realizing mode shift is challenging
Air pollution exposure during commute

**Background**

- Public transit can reduce VMT and emissions
- Bicycling and walking to and from stops can have health benefits
- Exposure can be highly variable

**Research findings**

- Vehicle exhaust can enter from outside
- Self pollution can be an issue
- Higher levels can be seen with public and active transport
- Commute can significantly contribute to total exposure
Environmental justice

**Background**
- EJ communities bear disproportionate burden of health impacts
- Stationary hazards and large emitters located in EJ communities
- Are all communities equally benefitting from air pollution reductions?

**Research findings**
- EJ communities more vulnerable to air pollution health impacts
- Air pollution can modify health impacts of stress
- DPM higher in EJ communities at same distance from road
- Pollutants going down everywhere with greatest reductions at EJ monitors
- Continue to address freight movement
Indoor exposure

Background

• Composed of toxic gases and particles
• Short-term and long-term respiratory effects
• 90% of time indoors
• Indoor pollutants have greater chance of being inhaled

Research findings

• Exposures are highly variable
• Ambient air pollution can penetrate indoors
• Properly maintained AC units and kitchen ventilation reduce exposure
• High efficiency filtration systems effective at removing particles
ARB research

Recent Projects
- Ultrafine exposure during bicycling near roadway
- Asthma disparities & susceptibility in California
- Air pollution & cardiovascular disease in California teachers

Current Projects
- Ultrafine modeling study
- Women's cardiovascular risk from PM exposure
- Cardiovascular effects of multipollutant exposure to PM & ozone
- Benefits of high efficiency filtration to children with asthma
- Sustainable communities research
  - ITHIM, commuter studies, Google collaboration
- Noise associated with near-roadway exposure
- Brake and tire wear projects

ARB research link: https://www.arb.ca.gov/research/research.htm
# Land Use & transportation guidance

## Technical Advisory: Near Roadway Mitigation Strategies
- Information on strategies to reduce exposure to traffic emissions near high-volume roadways
- Technical supplement to ARB’s Air Quality & Land Use Handbook
- [Link to Technical Advisory](https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF)

## Literature Review: Physical Activity, Health & the Built Environment
- White paper on the health benefits of physical activity & air pollution exposure while walking & biking
- [Link to the white paper](https://www.arb.ca.gov/research/vprp/physical_activity_and_health_final_161216.pdf)

## Air Quality & Land Use Handbook
- Reference guide for reducing air pollution impacts in new developments
- [Link to the Handbook](https://www.arb.ca.gov/ch/landuse.htm)
Future of health-related research

- Personal Exposure
- Community Monitoring
- Environmental Justice
- Composition & Speciation
- Sensitive Populations
Thank you!

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• Air Pollution Specialist
• Research Division
• 916-322-8280
• Brian.Moore@arb.ca.gov
Climate Change and Health: Resources from the CDPH Climate Change and Health Equity Program

Southern California Association of Governments Public Health Working Group Meeting
August 23, 2017

Meredith Milet, MPH
Epidemiologist
Climate Change and Health Equity Program
California Department of Public Health
Human Health Impacts of Climate Change

Environmental Degradation
- Forced migration, civil conflict, mental health impacts, loss of jobs and income

Extreme Heat
- Heat-related illness and death, cardiovascular failure

Severe Weather
- Injuries, fatalities, loss of homes, mental health impacts

Water & Food Supply Impacts
- Malnutrition, diarrheal disease

Degraded Living Conditions & Social Inequities
- Exacerbation of existing social and health inequities and vulnerabilities

Changes In Vector Ecology
- Malaria, dengue, encephalitis, hantavirus, Rift Valley fever, Lyme disease, chikungunya, West Nile virus

Air Pollution & Increasing Allergens
- Asthma, cardiovascular disease, respiratory allergies

Water Quality Impacts
- Cholera, cryptosporidiosis, Campylobacter, leptospirosis, harmful algal blooms

Impact of Climate Change on Human Health & Exacerbation of Existing Inequities

Adapted from CDC, J. Polk
Climate Change & Health Inequities
Share Root Causes

HEALTH INEQUITIES
- Chronic Disease
- Infectious Disease
- Heat Illness
- Injuries
- Displacement
- Access to Services
- Income/Wealth
- Exposure to Toxins
- Education
- Health Care
- Agriculture/Food
- Government

CLIMATE CHANGE
- Stress/Mental Illness
- Food/Water Insecurity
- Air Pollution
- Drought
- Vector-borne disease
- War, conflict, migration
- Severe weather
- Sea Level Rise
- GHG Emissions

LIVING CONDITIONS
- Physical Living Conditions
- Social Living Conditions
- Energy
- Transportation
- Land Use
- Corporations

SYSTEMS & INSTITUTIONS
- Energy
- Agriculture/Food
- Health Care
- Education
- Corporations
- Transportation
- Land Use

INEQUITABLE SOCIAL, POLITICAL & ECONOMIC POWER
- Racism
- Class
- Geography
- Gender
- Sexual Orientation
- Immigration Status
- Economy
- Government
- Corporations

Displacement based on
- Income/Wealth
- Exposure to Toxins
- Education

Health Inequities
Living Conditions
Climate Change
Social, Political & Economic Power
Inequitable Systems & Institutions

64
Fair and Healthy Climate Resilience

**HEALTH, EQUITY, & SUSTAINABILITY**

- Sustainable Resource Use
- Climate Action
- Equitable Access to Resources
- Equitable Opportunity

**HEALTHY LIVING CONDITIONS**

**EQUITABLE SOCIAL CONDITIONS**

**HEALTHY SYSTEMS & POLICIES**

**EQUITABLE ACCESS TO INSTITUTIONAL POWER**
Climate change will impact all people, but the most vulnerable suffer the most.

Climate change magnifies existing health inequities.

Climate change is a threat multiplier, amplifying existing risks.
Reducing Climate Change While Improving Health
Chronic Disease and Climate Change
Tools for Assessing Climate Change and Health Vulnerability

Website:
https://www.cdph.ca.gov/Programs/OHE/Pages/CalBRACE.aspx

Resources:
1. Climate Change and Health Vulnerability Indicators for California
2. Climate Change and Health Profile Reports
Climate Change and Health Vulnerability Indicators for California

**Environmental Exposures:**
- Heat
- Air Quality
- Drought
- Wildfires
- Sea Level Rise

**Population Sensitivity:**
- Children and Elderly
- Poverty
- Education
- Race and Ethnicity
- Outdoor Workers
- Vehicle Ownership
- Linguistic Isolation
- Disability
- Health Insurance

**Adaptive Capacity:**
- Air Conditioning Ownership
- Tree Canopy
- Impervious Surfaces
- Public Transit Access
Climate Change and Health Vulnerability Indicators for California

ENVIRONMENTAL EXPOSURES

Magnitude, frequency, and duration of environmental or climate-related factors that directly affect human health

- Heat
- Air Quality
- Drought
- Wildfires
- Sea Level Rise
Climate Change and Health Vulnerability Indicators for California

**POPULATION SENSITIVITY**

Physiological and socio-economic factors which directly or indirectly affect the degree to which a population is impacted by climate change

- Children and Elderly
- Poverty
- Education
- Race and Ethnicity
- Outdoor Workers
- Vehicle Ownership
- Linguistic Isolation
- Disability
- Health Insurance
- Violent Crime Rate
Climate Change and Health Vulnerability Indicators for California

ADAPTIVE CAPACITY
Responses and adjustments to the impacts of climate change, including the capacity to moderate damages, take advantage of opportunities, and cope with consequences.

Air Conditioning Ownership
Tree Canopy
Impervious Surfaces
Public Transit Access
Climate Change and Health Vulnerability Indicators for California

ENVIRONMENTAL EXPOSURES
Magnitude, frequency, and duration of environmental or climate-related factors that directly affect human health

POPULATION SENSITIVITY
Physiological and socio-economic factors which directly or indirectly affect the degree to which a population is impacted by climate change

ADAPTIVE CAPACITY
Responses and adjustments to the impacts of climate change, including the capacity to moderate damages, take advantage of opportunities, and cope with consequences.
Climate Change and Health Vulnerability Indicators

• Geographic Levels: State, Climate Region, County, Census Tract (for most indicators)

• Some indicators can be stratified by race/ethnicity

• Data sources are publicly available

• Accompanying narratives explain data sources, how to use the data, and their relevance to climate and health
Climate Change and Health Vulnerability Indicators

Environmental Exposures Domain

Environmental exposure refers to the magnitude, frequency, and duration of an environmental exposure or disease risk.

<table>
<thead>
<tr>
<th>Indicator Short Name</th>
<th>Indicator Definition</th>
<th>Data Source</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme Heat Days</td>
<td>Projected number of extreme heat days</td>
<td>Data from Cal-Adapt: SIO Instrumentation</td>
<td>Extreme heat narrative</td>
</tr>
<tr>
<td>Air Quality (PM2.5)</td>
<td>Three-year annual mean (PM2.5)</td>
<td>Data from Cal-Adapt: SIO Instrumentation</td>
<td>PM2.5 narrative</td>
</tr>
</tbody>
</table>

Figure 1. Projected Number of Extreme Heat Days for Contra Costa County

Data Source: Cal-Adapt, Scripps Institution of Oceanography
Content:

• Background on climate change

• Climate projections for the county and region

• Overview of the health impacts of climate change

• Description of most vulnerable populations

• Data on health, inequities, and vulnerable populations in the county

• Strategies and action steps
Climate Projections: South Coast Region

↑ 5-10 °F
July temp (2100)

↓ 3-10 inches
Annual rainfall in low areas (2100)

↑ 12-14/yr
Heat waves (2100)
Projected Annual Average Temperature
Ventura County, 2099

The information in the chart below corresponds to the selected area on the map (outlined in orange).

- Historical Average: 60.0°F
- Low-Emissions Scenario: 63.6°F (+3.6°F)
- High-Emissions Scenario: 66.0°F (+6.0°F)

Observed and Projected Temperatures:

- Low Emissions Scenario
- High Emissions Scenario
- Historic Measurements
Fire Hazard Severity Zones (FHSZ), Riverside County, 2007
Vulnerabilities in Imperial County Populations Most at Risk

41% of low-income residents have unreliable access to sufficient, affordable, nutritious food.

32% of households are estimated to lack air conditioning.

42% of adults have multiple chronic conditions.

6,366 residents are outdoor workers.

21% of households are without English proficiency.

Source:
CalBRACE Vulnerability Assessment Report, CDPH; CalBRACE Climate Change and Health Profile Report, CDPH
Vulnerabilities in Alameda County

Outdoor Workers

Population Working Outdoor Jobs, by Race/Ethnicity Groups, Alameda County, CA 2006-2010

Source: American Community Survey (ACS), 2006-2010
*Unreliable Data (Relative Standard Error > 30%)

31, 568 individuals are outdoor workers
Vulnerabilities in **Alameda County**

**Violent Crimes**

**Table X. Areas With Highest Number of Violent Crimes per 1,000 Residents, Alameda County, California, 2006-2010**

<table>
<thead>
<tr>
<th>City/Town</th>
<th>Crimes Per 1,000 Residents</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland</td>
<td>15</td>
<td>409723</td>
</tr>
<tr>
<td>Emeryville</td>
<td>13</td>
<td>10207</td>
</tr>
<tr>
<td>Berkeley</td>
<td>5</td>
<td>102700</td>
</tr>
<tr>
<td><strong>Alameda County</strong></td>
<td><strong>7</strong></td>
<td><strong>1510271</strong></td>
</tr>
<tr>
<td>California</td>
<td>4</td>
<td>37,615,047</td>
</tr>
</tbody>
</table>

Source: *Uniform Crime Reports from the Federal Bureau of Investigation, 2010*
Additional Resources

- California Environmental Health Tracking Program (cehtp.org)
- Healthy Communities Data and Indicators Project [https://tinyurl.com/ycefqdcj](https://tinyurl.com/ycefqdcj)

Coming Soon:

- California Heat Assessment Tool (CHAT) [427mt.com](http://427mt.com)
Health Disadvantage Index
http://phasocal.org/ca-hdi/
Thank you!

meredith.milet@cdph.ca.gov

CalBRACE program website, including links to the indicators and reports:

https://www.cdph.ca.gov/Programs/OHE/Pages/CalBRACE.aspx
Group discussion
THE INTERSECTION OF FOOD INSECURITY AND FOOD WASTE

Waste Not Ventura County

Dr. Robert Levin, M.D.  Katie Rowe,
R.D VCPH Health Officer  VCPH
WIC Director
FORTY PERCENT OF FOOD IN AMERICA IS WASTED.
Here’s the difference between food eaten and food tossed.

Food Waste = Wasted Resources

- **SEAFOOD**: Eaten 50%, Tossed 50%
- **FRUITS + VEGETABLES**: Eaten 48%, Tossed 52%
- **GRAIN PRODUCTS**: Eaten 38%, Tossed 62%
- **MEAT**: Eaten 22%, Tossed 78%
- **MILK**: Eaten 20%, Tossed 80%
14% of **WASTE STREAMS** is food waste

**METHANE** - 20x stronger greenhouse gas than CO$_2$
California Legislature: Driving the Movement to Reduce Waste

AB 1826
SOLID WASTE: ORGANIC WASTE
+ Decomposting organic waste major source of GHGs
+ Business must recycle 75% of their organic waste by 2020
+ Redirects resources to composting/digestive ops, save landfill space, reduce emissions

SB 1383
SUPER POLLUTANT REDUCTION ACT
+ 40% reduction in methane levels by 2030
+ ~20% reduction of edible food waste
+ Most aggressive law to tackle SLCPs in the country
Food Insecurity: Through a Food Waste Lens

Reducing just one third of food waste can feed all food insecure Californians!
WE KNOW THE ISSUES

WE KNOW HOW TO SOLVE THEM
- build a food recovery system
- establish a network of food rescue organizations
- build a distribution network to end hunger

WORKING TOGETHER, WE CAN DO THIS!
Save-the-Date

SCAQMD Marine Port Committee Meeting on the San Pedro Bay Ports Draft Clean Air Action Plan Update

1:00 PM on August 31, 2017
Long Beach Hilton
701 West Ocean Boulevard, Long Beach, CA 90831

The meeting agenda will be distributed one week before the meeting. For further information, contact Ana Ponce at (aponce@aqmd.gov, or 909-396-3008)?
Thank You!