AGENDA HIGHLIGHTS

- SAN DIEGO FORWARD: THE 2019-2050 REGIONAL PLAN – DRAFT PERFORMANCE MEASURES
- SAN DIEGO FORWARD: THE 2019-2050 REGIONAL PLAN – EMERGING TECHNOLOGIES WHITE PAPER

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MISSION STATEMENT

The Regional Planning Committee provides oversight for the preparation and implementation of the Regional Comprehensive Plan that is based on the local general plans and regional plans and addresses interregional issues with surrounding counties and Mexico. The components of the plan include transportation, housing, environment (shoreline, air quality, water quality, and habitat), economy, borders, regional infrastructure needs and financing, and land use and design.

San Diego Association of Governments · 401 B Street, Suite 800, San Diego, CA 92101-4231
(619) 699-1900 · Fax (619) 699-1905 · sandag.org
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# REGIONAL PLANNING COMMITTEE
Friday, February 2, 2018

<table>
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<tr>
<th>ITEM NO.</th>
<th>RECOMMENDATION</th>
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**APPROVAL OF MEETING MINUTES**

The Regional Planning Committee is asked to review and approve the minutes from its January 5, 2018, meeting.

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**PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS**

Members of the public shall have the opportunity to address the Regional Planning Committee on any issue within the jurisdiction of the Committee that is not on this agenda. Anyone desiring to speak shall reserve time by completing a “Request to Speak” form and giving it to the Clerk prior to speaking. Public speakers should notify the Clerk if they have a handout for distribution to Committee members. Public speakers are limited to three minutes or less per person. Committee members also may provide information and announcements under this agenda item.

| +3.      | APPROVE        |

**CONSENT**

**PROPOSED AMENDMENT TO THE SHORELINE PRESERVATION WORKING GROUP CHARTER (Sarah Pierce)**

The Regional Planning Committee is asked to approve an amendment to the Shoreline Preservation Working Group Charter.

| +4.      | APPROVE        |

**REPORTS**

**2019 REGIONAL PLAN COMMUNITY-BASED ORGANIZATIONS WORKING GROUP (Jane Clough)**

The Regional Planning Committee is asked to approve the charter and formation of the 2019 Regional Plan Community-Based Organizations Working Group.


The Regional Planning Committee is asked to provide feedback on the draft performance measures to be used in the development of San Diego Forward: The 2019-2050 Regional Plan.


Staff will provide an overview of the Emerging Technologies White Paper, which outlines technological developments to be considered in the development of San Diego Forward: The 2019-2050 Regional Plan.
7. CONTINUED PUBLIC COMMENTS
   If the five-speaker limit for public comments was exceeded at the beginning
   of this agenda, other public comments will be taken at this time. Subjects of
   previous agenda items may not again be addressed under public comment.

8. UPCOMING MEETINGS
   INFORMATION
   The next meeting of the Regional Planning Committee is scheduled for
   Friday, March 2, 2018, at 12:30 p.m.

9. ADJOURNMENT

+ next to an agenda item indicates an attachment
The Regional Planning Committee meeting was called to order by Chair Mary Salas (South County) at 12:32 p.m.

1. APPROVAL OF MEETING MINUTES (APPROVE)

Action: Upon a motion by Mayor Sam Abed (North County Inland) and a second by Councilmember David A. Zito (North County Coastal), the Regional Planning Committee approved the minutes from its December 1, 2017, meeting. Yes: Chair Salas, Vice Chair Kristine Alessio (East County), Councilmember Lorie Zapf (City of San Diego), Councilmember Zito, and Mayor Abed. No: None. Abstain: None. Absent: County of San Diego.

2. PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS

There were no public comments.

REPORTS

3. CALTRANS PLANNING GRANTS: PROPOSED FY 2018 PROGRAM BUDGET AMENDMENTS AND FY 2018-2019 PROJECT SUBMISSIONS (RECOMMEND)

Coleen Clementson, Principal Regional Planner, and April Petonak, Associate Regional Planner, presented the item.

Action: Upon a motion by Mayor Abed and a second by Vice Chair Alessio, the Regional Planning Committee recommended that the Board of Directors approve the proposed FY 2018 Program Budget amendments to accept Caltrans planning grant awards. Yes: Chair Salas, Vice Chair Alessio, Councilmember Zapf, Councilmember Zito, and Mayor Abed. No: None. Abstain: None. Absent: County of San Diego.

Action: Upon a motion by Mayor Abed and a second by Vice Chair Alessio, the Regional Planning Committee recommended that the Board of Directors approve the proposed SANDAG project submissions to the FY 2018-2019 Caltrans planning grant cycle. Yes: Chair Salas, Vice Chair Alessio, Councilmember Zapf, Councilmember Zito, and Mayor Abed. No: None. Abstain: None. Absent: County of San Diego.
4. FIRST TransNet TEN-YEAR COMPREHENSIVE PROGRAM REVIEW (DISCUSSION)

The TransNet Extension Ordinance requires that the Board of Directors, acting as the San Diego County Regional Transportation Commission, conduct a comprehensive review to evaluate the performance of the overall TransNet Program.

Ariana zur Nieden, Senior TransNet Program Manager, introduced the item.

Lien Luu, Michael Nash, and Cathy Brady, Sjoberg Evashenk Consulting, Inc. presented the results of the first TransNet Ten-Year Comprehensive Program Review.

Action: This item was presented for discussion.

5. CONTINUED PUBLIC COMMENTS

There were no continued public comments.

6. UPCOMING MEETINGS

The next meeting of the Regional Planning Committee is scheduled for Friday, February 2, 2018, at 12:30 p.m.

7. ADJOURNMENT

Chair Salas adjourned the meeting at 2:30 p.m.
**CONFIRMED ATTENDANCE**  
**SANDAG REGIONAL PLANNING COMMITTEE MEETING**  
**JANUARY 5, 2018**

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<th>Name</th>
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<tbody>
<tr>
<td>City of San Diego</td>
<td>Lorie Zapf</td>
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<td></td>
<td>Mark Kersey</td>
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<tr>
<td>County of San Diego</td>
<td>Kristin Gaspar</td>
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<td>Greg Cox</td>
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<td>East County</td>
<td>Kristine Alessio, Vice Chair</td>
<td>Member</td>
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<td></td>
<td>Colin Parent</td>
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<td>North County Coastal</td>
<td>David Zito</td>
<td>Member</td>
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<td>Cori Schumacher</td>
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<td>North County Inland</td>
<td>Sam Abed</td>
<td>Member</td>
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<td>John Aguilera</td>
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**Advisory Members**

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<td>Caltrans, District 11</td>
<td>Cory Binns</td>
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<td>Ann Fox</td>
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<td>San Diego Unified Port District</td>
<td>Garry Bonelli</td>
<td>Member</td>
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<td>Ann Moore</td>
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<td>Ed Gallo</td>
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<td>MTS</td>
<td>Mona Rios</td>
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<td>Guy McWhirter</td>
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<td>NCTD</td>
<td>Dave Druker</td>
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<td>Regional Planning Technical Working Group</td>
<td>Karen Brindley</td>
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<td>Southern California Tribal Chairmen’s Association</td>
<td>Eric LaChappa</td>
<td>Member</td>
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<td>Department of Defense</td>
<td>Steve Chung</td>
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<td>Wildlife Conservation Board</td>
<td>John Donnelly</td>
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<td>Vacant</td>
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<td>US Army Corps of Engineers</td>
<td>Therese Bradford</td>
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<td>Michelle Matson</td>
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<td></td>
<td>Susan Wynn</td>
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PROPOSED AMENDMENT TO THE SHORELINE PRESERVATION WORKING GROUP CHARTER

Introduction

The Shoreline Preservation Working Group (Working Group) was established in the late 1980s as the Shoreline Erosion Committee. The Working Group's current status is that of a standing working group that advises the Regional Planning Committee on shoreline management issues related to the implementation of the Shoreline Preservation Strategy and Coastal Regional Sediment Management Plan. Based on the Working Group's input, the Regional Planning Committee makes policy recommendations to the SANDAG Board of Directors.

The Working Group reviewed amendments to its charter at its December 1, 2017, meeting. The Regional Planning Committee is asked to approve the proposed revisions to the charter and expand the Working Group's membership to include representation from the cities of National City and Chula Vista.

Discussion

Charter Amendment

The Working Group's recommended changes to the Charter are shown in tracked changes in Attachment 1. Proposed administrative changes update the description of San Diego Forward: The Regional Plan (Regional Plan) and clarify the description of the Coastal Regional Sediment Management Plan. In addition, minor edits are recommended to the Working Group's guiding principles. Recognizing that beach nourishment is just one technique within a suite of adaptation strategies that can help combat coastal erosion and the impacts from sea-level rise, the Working Group recommends that the charter be updated to reflect possible discussion of other adaptation strategies that would enhance coastal resiliency. Furthermore, this charter amendment allows the Working Group to formulate strategies that will enhance the region's ability to adapt to the consequences of climate change, namely sea-level rise, which is identified as a continuing action in the Regional Plan.
Membership Appointments

The amendment to the Working Group’s charter also proposes to add representatives from the cities of National City and Chula Vista as voting members to the Working Group. Currently, the Working Group has 11 voting members (the cities of Carlsbad, Coronado, Encinitas, Del Mar, Imperial Beach, Oceanside, San Diego, Solana Beach, County of San Diego, Port of San Diego, and the U.S. Navy). This amendment would bring the total number of voting members on the Working Group to 13 and reflects the Working Group’s commitment to focus on a broad array of erosion control and sea-level rise adaptation strategies that affect both bayfront and coastal communities.

Next Steps

Pending approval of the Regional Planning Committee, SANDAG staff and the Working Group’s Chair will coordinate with the cities of National City and Chula Vista regarding representation on the Working Group.

CHARLES “MUGGS” STOLL
Director of Land Use and Transportation Planning


Key Staff Contact: Sarah Pierce, (619) 699-7312, sarah.pierce@sandag.org
WORKING GROUP CHARTER
Shoreline Preservation Working Group

PURPOSE

The Shoreline Preservation Working Group (Working Group) was formed as a committee in the 1980s and currently advises the Regional Planning Committee on issues related to the implementation of the Shoreline Preservation Strategy (Strategy) adopted in 1993, the Coastal Regional Sediment Management (RSM) Plan adopted in 2009, and San Diego Forward: The Regional Plan (which merges the Regional Comprehensive Plan [RCP] adopted in 2004 and the 2050 Regional Transportation Plan and Sustainable Communities Strategy adopted in 2011).

The Strategy proposes an extensive beach building and maintenance program for the critical shoreline erosion areas in the region. It contains a comprehensive set of recommendations on the beach building program and on financing and implementation. The RSM Plan incorporates the goals and objectives laid out in both the Strategy and RCP. It is a guidance and policy document that addresses how management of sediment targeted at coastal erosion can be implemented throughout the San Diego region.

The Working Group has technical expertise and background knowledge of regional shoreline issues, which is useful in applying the principles and goals laid out in the Strategy, the RSM Plan, and San Diego Forward: The Regional Plan. Continuing to support the region’s ongoing and future beach nourishment efforts and other sea-level rise adaptation strategies is a top priority for the Working Group. Additionally, in 1996, the San Diego Association of Governments (SANDAG) enacted a Regional Shoreline Monitoring Program and the Working Group will continue to oversee and implement this program. The Working Group also will monitor the region’s lagoon efforts and projects as part of the larger effort for effective management of sediment resources.

GUIDING PRINCIPLES

- Commitment to unified approach for local decisions on sand replenishment and management of sediment resources
- Address local needs and maximize positive regional impacts
- Encourage cooperation and coordination
- Promote opportunities for beach sand replenishment and other sea-level rise adaptation strategies to enhance region-wide climate resiliency
LINE OF REPORTING

The Working Group, established by the Board of Directors, advises the Regional Planning Committee (RPC) on issues related to the implementation of the Strategy, the RSM Plan, and San Diego Forward: The Regional Plan. Based on the Working Group's input, the RPC makes policy recommendations to the SANDAG Board of Directors. Regular updates on Working Group activities should be made to the RPC to update them on current programs and projects and further strengthen the connection between the two groups.

RESPONSIBILITIES

The Working Group's main responsibilities are to make recommendations to the RPC on issues related to the implementation of the adopted Strategy, the RSM Plan, and San Diego Forward: The Regional Plan focusing on future beach nourishment opportunities and the shoreline monitoring program.

MEMBERSHIP

The Working Group has 11-13 voting members, which are elected officials from bayfront and coastal cities, the County of San Diego, and a representative from the San Diego Unified Port District and the U.S. Navy. Additionally, the Working Group has several non-voting advisory members which are representatives from community groups and organizations, environmental groups, state and federal agencies, and other interested stakeholders. Voting members of the Working Group and their alternates are selected by the bodies they represent. Non-voting members of the Working Group also are selected by the bodies they represent and are categorized as either Technical or Community Advisors and provide added knowledge and input to the Working Group. In the event of a lack of participation by a member of the Working Group or the group/agency the member represents, the RPC will consider for approval any potential modifications to the membership roster in order to achieve a quorum and full participation.

MEETING TIME AND LOCATION

The Working Group meetings are generally held quarterly at 11:30 a.m. on the first Thursday of the month. Meetings are normally held in the 7th floor conference room at the SANDAG offices. Additional meetings also may be scheduled as deemed necessary by the Working Group Chair.

SELECTION OF THE CHAIR

The Working Group's Chair and Vice-Chair are selected by the Chair of the SANDAG Board of Directors and shall serve until replaced.

DURATION OF EXISTENCE

The Working Group was originally created as a committee in the 1980s. The Working Group's current status is that of a standing working group. An evaluation of the group's work will be conducted annually as part of the SANDAG Executive Committee's annual committee/working group review process.
2019 REGIONAL PLAN COMMUNITY-BASED ORGANIZATIONS WORKING GROUP

Introduction

SANDAG has partnered with 13 Community-Based Organizations (CBOs) to facilitate timely and meaningful involvement from disadvantaged communities throughout the development of San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan).1 The 13 CBOs were selected through a competitive Request for Proposals (RFP) for Community-Based Outreach Services sent to organizations in the disadvantaged communities throughout the region in May 2017. The selected CBOs initiated work with SANDAG on September 1, 2017, and will assist in the outreach and public participation activities in the development of the 2019 Regional Plan.

Discussion

In developing the 2019 Regional Plan, SANDAG will outreach and seek input from all residents in the San Diego region. SANDAG realizes however, that certain populations, particularly low-income, minorities, those with limited English proficiency, and seniors, can be harder to reach due to lack of representation, language barriers, limited resources, and other factors.

The CBOs were selected to contract with SANDAG based on demonstration of the following:

a. A well-established and trusted role in their respective communities with a reputation for consistency and excellence in service.

b. Capacity to convene, engage, and seek input from low-income, minority, those with limited English proficiency, and senior community members.

c. Institutional capacity to implement a variety of outreach activities such as conducting surveys, facilitating community workshops and focus groups, compiling and synthesizing community input, representing community input in reports and meetings with SANDAG, and performing necessary administrative contract responsibilities.

Recommendation

The Regional Planning Committee is asked to approve the charter and formation of the 2019 Regional Plan Community-Based Organizations Working Group.

1 Disadvantaged Communities: low income, minorities, seniors, and those with limited English proficiency.
In addition, the selection process took into account representation from the communities with higher concentrations of disadvantaged populations\(^2\) illustrated in the geographic distribution map included as Attachment 1. The organizations and communities in which they primarily will conduct outreach are listed below.

**Northern San Diego**

- The Alliance for Regional Solutions (Escondido/Oceanside/San Marcos/Vista)
- National Latino Research Center, Cal State University San Marcos (Vista/Escondido/San Marcos/Fallbrook)
- Vista Community Clinic (Vista)

**Central/Eastern San Diego**

- Bayside Community Center/Linda Vista Collaborative (Linda Vista)
- Nile Sisters Development Initiative (City Heights)
- Barrio Logan College Institute (Barrio Logan/Logan Heights)
- City Heights Community Development Corporation (City Heights)
- Urban Collaborative Project (Southeast San Diego)
- El Cajon Collaborative (El Cajon)

**Southern San Diego**

- Casa Familiar (San Ysidro/Imperial Beach)
- Chula Vista Community Collaborative (Western Chula Vista)
- Olivewood Gardens (National City)
- Operation Samahan (National City)

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\(^2\) Although the map highlights low-income populations, it illustrates that the CBOs selected correspond to the areas of most need for the purpose of outreach and community involvement; not for the social equity analysis of the transportation network.
Role of the Community-Based Organizations

The CBOs have been contracted to provide two levels of involvement: (1) provide input on specific elements of the 2019 Regional Plan from a social equity perspective; and (2) conduct outreach activities to engage disadvantaged communities.

The RFP laid out the option of forming a SANDAG working group to provide a public forum for the CBOs and other interested stakeholders to provide input into the 2019 Regional Plan from a social equity perspective. As a component of Community-Based Outreach Services Contract formed with each CBO, the Executive Director, Board Member, or designee is expected to serve as a representative on the Working Group. A draft Community-Based Organizations Working Group (CBO Working Group) charter has been prepared for consideration by the Regional Planning Committee (Attachment 2).

Next Steps

Should the Regional Planning Committee approve the CBO Working Group Charter, the SANDAG Board Chair will be asked to appoint a SANDAG Board Member to serve as its chair. The CBO Working Group would sunset with the adoption of the 2019 Regional Plan.

CHARLES “MUGGS’ STOLL
Director of Land Use and Transportation Planning

Attachments: 1. Community-Based Organization Partners Map – September 2017
2. 2019 Regional Plan CBO Working Group – Charter

Key Staff Contact: Jane Clough, (619) 699-1909, jane.clough@sandag.org
Community-Based Organization Partners
September 2017

1. Alliance for Regional Solutions
2. National Latino Research Center (CSUSM)
3. Vista Community Clinic
4. Barrio Logan College Institute
5. Bayside Community Center
6. Casa Familiar
7. Chula Vista Community Collaborative
8. City Heights Community Development Corporation
9. El Cajon Collaborative
10. Nile Sisters
11. Operation Samahan
12. Olivewood Gardens
13. Urban Collaborative Project

1 dot = 100 low-income households
(Low-income is defined as 200% of the Federal Poverty Level)
Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates
PURPOSE

The purpose of the 2019 Regional Plan Community-Based Organizations Working Group (Working Group) is to provide ongoing public input from disadvantaged or underrepresented communities in the region into key activities associated with developing San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan) and related planning activities with a focus on the social equity perspective.

LINE OF REPORTING

The Working Group reports to the Regional Planning Committee (RPC) on specific 2019 Regional Plan elements. Based on the Working Group’s input, the RPC makes policy recommendations to the SANDAG Board of Directors. Regular updates on Working Group activities should be made to the RPC to update them on current programs and projects and further strengthen the connection between the two groups.

RESPONSIBILITIES

The Working Group will review and provide input that will be used to develop and adopt the 2019 Regional Plan. The Working Group also may be asked to provide a social equity perspective on other agency initiatives or planning efforts, including the Public Participation Plan. The Working Group will assist with associated public outreach and help inform and encourage diverse, inclusive and active, public involvement in the 2019 Regional Plan.

MEMBERSHIP

The Working Group is comprised of 13 representatives from community-based organizations (CBOs) or community collaboratives serving underserved/disadvantaged communities selected through a competitive Request for Proposals process by SANDAG. As a component of Community-Based Outreach Services Contract formed with each CBO, the Executive Director, Board Member, or designee is expected to serve as a representative on the Working Group. If the appointed representative is unable to attend a given meeting, an alternate must attend. As a public forum, other organizations and individuals are encouraged to attend.

MEETING TIME AND LOCATION

The Working Group will meet bi-monthly at SANDAG, as well as other times and locations as may be needed.

WORKING GROUP LEADERSHIP

The Chair of the Working Group shall be a member of the SANDAG Board of Directors, appointed by the Chair of the Board. The Chair will be a non-voting member who will manage meetings and facilitate discussions amongst the members.

DURATION OF EXISTENCE

The Working Group will sunset with the adoption of the 2019 Regional Plan.
SAN DIEGO FORWARD: THE 2019-2050 REGIONAL PLAN – DRAFT PERFORMANCE MEASURES

Introduction

The Regional Plan is a federally- and state-mandated document that presents the overall vision for how the San Diego region will grow through 2050, including all of the transportation-related investments that will be needed to support that vision. It is updated every four years, and must be fiscally constrained, meaning the cost of projects and programs included must be supported by current revenue sources as well as reasonably expected new sources.

In order for the SANDAG Board of Directors to determine the final combination of projects to fulfill the vision of the Regional Plan, several scenarios are developed for evaluation and consideration. Once the scenarios are developed, performance measures are used to evaluate the various combinations. The performance measures help answer key questions in order to provide a “scorecard” that compares and contrasts how the different combinations of transportation projects help support innovative mobility and planning; a vibrant economy; and a healthy environment and communities in the San Diego region.

Over the past three months, staff has sought input on the performance measures from SANDAG working groups, stakeholders, and the public. In January 2018, a peer review panel, comprised of professionals from academia, other metropolitan planning organizations, and the private sector was convened to provide additional input to further strengthen the performance measures. The Regional Planning Committee is asked to provide feedback on the draft performance measures created through this process.

Discussion

Background

Performance measures are used to answer key questions that help to evaluate multimodal transportation network scenarios against one another. Based on this comparison, the Board of Directors will be asked to select a Preferred Transportation Scenario, which is the final mix of projects and programs that will be used as the basis of San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan). Throughout this process, staff also evaluates whether the various scenarios meet the regional per capita greenhouse gas (GHG) emissions reduction targets for cars and light trucks established by the California Air Resources Board per Senate Bill 375 (Steinberg, 2008). A Title VI analysis, which measures the comparative distributions of benefits and burdens of the transportation network scenarios to ensure there is no disproportionate impact on disadvantaged populations, also will be performed.
The performance measures from the 2015 Regional Plan were used as a starting point for the development of the draft performance measures for the 2019 Regional Plan. Initial updates were made to the draft performance measures to align with federal measures included in the Fixing America's Surface Transportation (FAST) Act and feedback from stakeholders from throughout the region, the public, SANDAG Policy Advisory Committees, and the Board of Directors.

Summary of Input Received

SANDAG Working Groups and TransNet Independent Taxpayer Oversight Committee

Staff sought input on the draft performance measures from stakeholders at meetings of the Active Transportation Working Group, Cities/County Transportation Advisory Committee, Interagency Technical Working Group on Tribal Transportation Issues, Freight Stakeholders Working Group, San Diego Regional Military Working Group, Regional Planning Technical Working Group, San Diego Regional Traffic Engineers Council, Social Services Transportation Advisory Council, and TransNet Independent Taxpayer Oversight Committee. Interest was expressed in performance measures that quantify network connectivity, goods movement mobility, air quality and climate change, and financial sustainability. A summary of comments provided at these meetings is included in Attachment 1.

Community-Based Organizations

SANDAG has partnered with 13 community-based organizations (CBOs) to assist with outreach to traditionally underserved communities throughout the development process for the 2019 Regional Plan. Staff sought input from the CBOs at its November and December 2017 meetings. Meeting participants expressed interest in metrics that measured accessibility to jobs and other key destinations via transit, safety for transit users, and GHG reductions. A summary of comments received from the CBOs is included in Attachment 2.

Public Outreach: Public Workshop and Online Survey

On December 4, 2017, a public workshop was held at Caltrans to solicit public input on the draft performance measures with more than 100 participants. Attendees participated in facilitated discussions (in English and Spanish) and comments received included requests for measures of congestion, vehicle miles traveled, health outcome metrics, transit frequency, bicycle and pedestrian facility quality, and first mile/last mile concerns. A summary of the feedback received at the public workshop is included in Attachment 3.

An online survey also was launched on December 4, 2017, to gather additional input. More than 300 individuals participated in the survey, which was available in English and Spanish. Comments received included requests for measures of congestion relief, vehicle miles traveled, air quality and climate change, transit accessibility and use, and active transportation. A summary of the feedback received via the online survey is included as Attachment 4.
Peer Review Panel

A peer review panel also was convened to provide feedback on opportunities to further strengthen the performance measures and key questions. The panelists were provided with the 2015 Regional Plan performance measures; draft 2019 Regional Plan performance measures; and comments from the SANDAG working groups, CBOs, public workshop, and online survey in advance of the meeting. The panelists, which included professionals from academia, the U.S. Federal Highway Administration Resource Center, metropolitan planning organizations, and the private sector, met at SANDAG on January 17, 2018. After a day-long meeting, the panel provided recommendations for revision and enhancement to the draft performance measures.

The recommendations of the panel focused on three overarching themes: (1) Include fewer metrics, which measure what is most important and are supported by quality data; (2) Focus on creating distinct transportation network scenarios that include different combinations of projects, technologies, or funding strategies; and (3) Provide simple graphics and text to convey the results of the measures and why they matter.

The panel recommended that SANDAG create a two-tiered system of performance measures with a limited number of primary key questions and performance measures, which would be used to compare the performance of the transportation scenarios in the areas of mode share, delay, safety, social equity, GHG reductions, and public health. The additional metrics could be modeled and included in the 2019 Regional Plan for informational purposes. A brief biography for each panelist and a summary of the panel's findings are included in Attachment 5.

Draft Performance Measures

Based on the recommendations of the Peer Review Panel and input received from the SANDAG working groups, stakeholders, and public, staff has developed two tiers of draft performance measures for review and discussion by the Regional Planning Committee.

Attachment 6 provides a draft list of 12 performance measures which would be used to answer eight key questions in order to compare and evaluate the various multimodal transportation scenarios. Attachment 7 provides a set of additional metrics which could be modeled and also included in the 2019 Regional Plan in order to demonstrate how the Plan helps to serve the transportation needs of the region. Additionally, the FAST Act requires that certain federal metrics in the areas of mode share, delay, safety, infrastructure condition, and air quality be monitored with current field or observed data (instead of estimated for future years) and be reported separately in the 2019 Regional Plan.
Next Steps

Based on feedback from the Regional Planning Committee, the Board of Directors is scheduled to review the performance measures at its March 23, 2018, meeting.

CHARLES “MUGGS” STOLL
Director of Land Use and Transportation Planning

Attachments: 1. SANDAG Working Groups and TransNet Independent Taxpayer Oversight Committee Comments
2. Community-Based Organization Comments
3. Public Workshop Comments
4. Online Survey Comments
5. Peer Review Panel Biographies and Comments
6. Key Questions and Draft Performance Measures
7. Additional Draft Performance Measures

Key Staff Contact: Rachel Kennedy, (619) 699-1929, rachel.kennedy@sandag.org
<table>
<thead>
<tr>
<th>No.</th>
<th>Working Group/Advisory Council</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Active Transportation Working Group</td>
<td>Can the performance measure for question #6, “Change in percent of income consumed by transportation cost” by calculated by mode?</td>
</tr>
<tr>
<td>2</td>
<td>Active Transportation Working Group</td>
<td>Commented on language in Mobility Choices policy objectives and recommended updating to “safer and more secure …” or something similar.</td>
</tr>
<tr>
<td>3</td>
<td>Active Transportation Working Group</td>
<td>For on-road SDGC forming pollutants a total number, rather than one scaled per person, would make the most sense for this measure.</td>
</tr>
<tr>
<td>4</td>
<td>Active Transportation Working Group</td>
<td>Mention of new methodology shown on ARIP regarding AT trip modeling on low stress routes.</td>
</tr>
<tr>
<td>5</td>
<td>Active Transportation Working Group</td>
<td>Recommending question #3 performance measure on number of non-motorized serious injuries and fatalities be separated by mode (bike and pedestrian).</td>
</tr>
<tr>
<td>6</td>
<td>Active Transportation Working Group</td>
<td>Request for health benefit to be looked out separately in addition to the Cost/Benefit analysis.</td>
</tr>
<tr>
<td>7</td>
<td>Active Transportation Working Group</td>
<td>Request inclusion of Climate Action Plan (CAP) goals at the jurisdiction or regional level to help understand if approaching CAP goals with each network scenario.</td>
</tr>
<tr>
<td>8</td>
<td>Active Transportation Working Group</td>
<td>Request question #8 performance measure on percent of population within 30 minutes of jobs or higher education to list driving and transit separately.</td>
</tr>
<tr>
<td>9</td>
<td>Active Transportation Working Group</td>
<td>Request that mode share performance measure be calculated separately for Transit Priority Areas (TPA) and non-TPA’s.</td>
</tr>
<tr>
<td>10</td>
<td>CTAC</td>
<td>Likes the cost effectiveness score idea.</td>
</tr>
<tr>
<td>11</td>
<td>CTAC</td>
<td>Recommends measure to look at number or density of routes parallel to interstates and other major routes. Getting to question of system resilience or network density to ensure safety during a significant event.</td>
</tr>
<tr>
<td>12</td>
<td>CTAC</td>
<td>Would like to see a cost effectiveness score for a project. Also asks if there is a transitridenhip target the plan is shooting for? How do we judge if we are investing enough or too much into any particular mode?</td>
</tr>
<tr>
<td>13</td>
<td>Freight Stakeholders WG</td>
<td>In the meeting yesterday, I suggested adding measures regarding truck parking. I looked up some materials on that measure, as well as freight mobility, and have put them below. Please pass them on to your colleague Rachel, and I’m happy to discuss further if it’s helpful.</td>
</tr>
<tr>
<td></td>
<td>Freight Stakeholders WG</td>
<td>(<a href="https://www.dot.gov/publications/fhwapo5/160906wp07.pdf">https://www.dot.gov/publications/fhwapo5/160906wp07.pdf</a>) The page also mentions a fluidity index as a number of places, and I would suggest that a fluidity index should be the end goal for our freight performance measures. See here: (<a href="https://www.dot.gov/publications/fhwapo5/160906wp07.pdf">https://www.dot.gov/publications/fhwapo5/160906wp07.pdf</a>)</td>
</tr>
<tr>
<td></td>
<td>Freight Stakeholders WG</td>
<td>I was thinking about good measures for truck parking. One measure is the number of spaces (see p. 122 of the Rhode Island plan). See page 50 of the Ohio State Freight Plan for a proposed system on truck parking availability (<a href="https://www.dot.state.oh.us/Divisions/Freight/SP/P/Statewide/Freight/Documents/ODOT_FreightPlan_FINAL_JUN2017.pdf">https://www.dot.state.oh.us/Divisions/Freight/SP/P/Statewide/Freight/Documents/ODOT_FreightPlan_FINAL_JUN2017.pdf</a>).</td>
</tr>
<tr>
<td>14</td>
<td>Freight Stakeholders WG</td>
<td>Recommends a truck safety metric.</td>
</tr>
<tr>
<td>15</td>
<td>Freight Stakeholders WG</td>
<td>Recommends tracking spending on supporting infrastructure for new technology.</td>
</tr>
<tr>
<td>16</td>
<td>Freight Stakeholders WG</td>
<td>Under the vibrant economy goal recommends an increase freight volume measure primarily with freight only projects.</td>
</tr>
<tr>
<td>17</td>
<td>Military Working Group</td>
<td>Adding to the idea of a connected system metric is the last mile issue.</td>
</tr>
<tr>
<td>18</td>
<td>Military Working Group</td>
<td>Commented on inclusion of technology to reduce barriers to transit use such as pre purchasing tickets, tickets on a mobile device etc.</td>
</tr>
<tr>
<td>19</td>
<td>Military Working Group</td>
<td>Freight does not only consist of trucks. Recommends adding to the freight reliability to include additional freight modes.</td>
</tr>
<tr>
<td>20</td>
<td>Military Working Group</td>
<td>Metric missing on how well connected the system is especially between modes.</td>
</tr>
<tr>
<td>21</td>
<td>SANTEC</td>
<td>Follow up to comment #1 on average cost per rider per year as an idea for a performance metric.</td>
</tr>
<tr>
<td>22</td>
<td>SANTEC</td>
<td>Interest in financial sustainability, particularly possible performance related to transit.</td>
</tr>
<tr>
<td>23</td>
<td>SSTAC</td>
<td>Does the System Safety measurement [Question #3 “Is the transportation system safer?” under Innovative Mobility and Planning goal] include personal security? Suggestion made that personal safety be accounted for in this measure in terms of feeling secure when taking public transit.</td>
</tr>
<tr>
<td>24</td>
<td>SSTAC</td>
<td>Support for a measurement that evaluates personal security when using transit.</td>
</tr>
<tr>
<td>25</td>
<td>SSTAC</td>
<td>Support for a measurement that evaluates personal security when using transit.</td>
</tr>
<tr>
<td>26</td>
<td>SSTAC</td>
<td>Support for a measurement that evaluates personal security when using transit. Expressed interest in question #4 including transit assets (rolling fleet).</td>
</tr>
<tr>
<td>27</td>
<td>TWG</td>
<td>Letter included separately.</td>
</tr>
</tbody>
</table>
December 14, 2017

SANDAG
401 B Street, Suite 800
San Diego CA 92101

Re: 2019 Regional Plan Performance Measures

To our peers at SANDAG:

City of Lemon Grove staff reviewed and discussed the 2019 Regional Plan Performance Measures and would like to offer additional input on the matter. Though we appreciate the difficulty of crafting meaningful measures, City staff believe greater commitment to equity and adaptability is needed.

The importance of a transportation system that benefits communities equally cannot be overstated. Current measures must be revised to prioritize connectivity and new metrics that specifically assess equity should be developed. Examples might include:

- Average travel times to/from work for communities below San Diego Area Median Income;
- Aggregate investment dollars in areas below San Diego Area Median Income;
- A system wide connectivity index (links divided by nodes);
- Percent of eligible students and/or employees participating in discounted monthly pass programs; or
- Percent of transportation investment towards public transport subsidies.

The San Diego region should also be ready to adapt to new technology and evolving modes of movement. Disruptive technologies ranging from autonomous vehicles and digital platforms to drones and vactrains are on the horizon and performance measures should seek to provide flexibility of transportation investment dollars. Some options include:

- A shift from parking to loading areas;
- Average construction time of each mile added to the network of regardless of mode;
- Average cost of each mile added to the network regardless of mode;
- Projected system maintenance costs compared to projected revenues;
- The total number of required project phases resulting in useable segments or infrastructure;
- Percent of population using integrated transit and rideshare apps; or
- Percent of transportation investment towards rideshare subsidies.

Lastly, please consider a Class I pedestrian and bicycle active transportation route from Downtown San Diego on Market Street, through Lemon Grove and into El Cajon along the Orange Line. Investments in lower income communities offer great return on investment by these criteria and most others. Lemon Grove's adopted Connect Main Street plan would create a multimodal corridor along Main Street beginning at Lemon Grove Depot passing through the southern boundary of the City into Encanto along Akins. It is our hope to spur the planning and creation of a regional corridor providing opportunities for lower income communities to actively and safely commute to regional centers.
Lemon Grove staff are available should you like to discuss the City of Lemon Grove's comments. Thank you again for the opportunity to provide input on the 2019 Regional Plan Performance Measures.

Sincerely,

[Signature]

David De Vries
Development Services Director
<table>
<thead>
<tr>
<th>No.</th>
<th>Comment</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>For questions 1 and 2 looking at absolute numbers in addition to percentages will help us understand change even as the population continues to grow.</td>
</tr>
<tr>
<td>2</td>
<td>On question 4 and the related performance measure of percent of transportation investments towards maintenance and rehabilitation, comment was made that this is an output measure not an outcome measure and recommended revisiting this.</td>
</tr>
<tr>
<td>3</td>
<td>On question 9, regional air quality, it was asked if there are subregional analyses as well.</td>
</tr>
<tr>
<td>4</td>
<td>Recommendation that access to key destination by population be for transit and vehicles separately.</td>
</tr>
</tbody>
</table>
## Community-Based Organization (CBO) Comments

<table>
<thead>
<tr>
<th>No.</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Commented on including a youth breakdown for the social equity sections (elderly, low income, minority). Also requested ride share mode be calculated separately from other mode shares due to the different challenges associated with these.</td>
</tr>
<tr>
<td>2</td>
<td>Commented on safety and trolley use, also expressed desire to measure personal safety with transit use.</td>
</tr>
<tr>
<td>3</td>
<td>Expressed desire to incorporate idea and/or perception of safety at transit stations into the safety category.</td>
</tr>
<tr>
<td>4</td>
<td>In addition to the population serviced by high frequency transit, would like to see a performance measure on the proportion of the network that is high frequency.</td>
</tr>
</tbody>
</table>

- More global comments, relevant to performance measures and other information provided at the Dec. 4 workshop: Up to this new VTP round, my understanding is that the SANDAG Ridership model has not measured many of the things that actually drive ridership, notably, on a different network system.
  - While it’s good to have performance measures, it is also necessary to understand how these measures themselves will be measured. Please add a column to the right of “Proposed 2019 Regional Plan Performance Measures” for disclosure of how each performance measure will be assessed, whether by computer model (and which one), or by other means (and which). |
  - Related to travel times, frequency, and real-world access. In measuring distances and times, use door-to-door travel times, to or from select points throughout the region, rather than TAZ centroids. Using the “artificial” centroid of a TAZ can throw off measures of actual distances and times. |
  - Use actual walking distance to true rapid transit residences and jobs within a real quarter mile walk, not a simplified quarter mile radius. Finally, at the Dec. 4 workshop it was described how a set of “unconstrained network projects” have already been adopted by the SANDAG Board. I believe I heard that this closed set of projects are to be the only set of projects which will be evaluated and reprioritized to make up the different transit system design scenarios to be defined this next Spring. This would appear to functionally exclude from consideration any alternative network design, and different projects in alternative designs. This is obviously important point to be clear on. At the workshop I asked two different SANDAG staff if different projects can be submitted and included in this process at this time. I was encouraged to submit projects, if I know of any. Referenced by this submission, one or more said projects will be submitted to the SANDAG staff I have spoken with, and will be posted in the CBO Workspaces set up for CBO work. |

- Raised concern for how segments of the population may be affected by immigration enforcement as a safety concern related to question #3. |

- Recommendation for a fresh food or food accessibility metric. |

- Recommendation for inclusion in the plan in some fashion advising jurisdictions on zoning and food access. |

- Request for PM outputs at sub-regional geographies such as zip codes, perhaps with the social justice focused PM’s. |

- Supports ideas for perception of safety around transit and separate measure on high frequency transit as a proportion of the network. |

- These comments are based on the information and discussion provided to CBO representatives on Performance Measures and shared at the Dec. 4 public workshop. Suggest add to or amend the list of draft proposed performance measures. |
  - Under Innovative Mobility and Planning, add route and service frequency for all modes of public transit. This relates to key questions 1 and 2. Frequency is currently referenced indirectly under draft measure 7A (without defining “high frequency” or the modes this refers to), but needs to be measured universally for all public transit services and modes. Frequency here means how often a service route is available to a rider, e.g. every 15 minutes, 30 minutes, etc. |

- Draft measure 18, suggest measure not just “peak hour” but off-peak as well (since many work schedules today are “off-peak”, and to measure non-work related trips, medical, commercial, etc.). And measure total hours of excessive delay, not just per capita. |

- Draft measures 7A and 7B, measure not for only “high frequency” transit stops, but for all transit stops and stations, and measure within 0.25 miles, rather than within 0.5 miles (a quarter mile distance being a widely accepted measure of accessibility). And note additional “global” comment below re: how distances are measured in assessing tools/computer models. |

- Draft measure 8A – Why 30 minutes, why not the 15 min. measure in BIBB Better, please measure and disclose percentages for several time distances, e.g. 5, 10, 15, etc. And as others commented, please measure for K-12 education as well as higher education. |

- To aid in perception of safety associated with transit facilities data on lighting, emergency call boxes, reduced wait times and police presence could be used as proxies. |

- Will follow up with more detailed written comments, however, noted desire to see a transit frequency performance measures added to goal area one (Innovative Mobility and Planning). Also requested more details on calculation processes. |

- Letter included separately.
Comments on the SANDAG 2019 Regional Planning Process

While participating in the recent workshop on Performance Measures, and studying the 2015 Plan and its appendices, I was struck by the disparity between the lofty goals and the fatally flawed planning process. Apart from any discussion of individual performance measures, I believe that SANDAG needs to reexamine the entire planning process. There are three kinds of metrics that are relevant to the planning process: 1. Mandatory Requirements, 2. Plan Performance Measures, and 3. Project Evaluation Criteria. I have heard a lot about the Performance Measures, a little about the Project Selection Criteria, and nothing about the Mandatory Requirements. My comments below discuss each of these kinds of metrics, and their roles in the development of a final plan.

Mandatory Requirements

Mandatory Requirements are those measures that distinguish an acceptable plan from an unacceptable plan. To avoid embarrassment all around, staff should not submit a plan to the board that fails to meet the mandatory requirements. If they should do that, the board has an obligation to reject that plan. That obligation is enforceable by the courts, since the mandatory requirements are spelled out in the law.

While there have been some general mandatory requirements in previous cycles, AB805 introduces some new specific requirements on the plan. The relevant section of AB805 is included in Appendix A.

The new requirements that deal with the content of the plan are the most important. The 2019 plan must:
1. meet the greenhouse gas emissions reduction targets set by the State Air Resources Board.
2. include strategies that provide for increased mode shift to public transportation.
3. identify disadvantaged communities and include transportation strategies to reduce pollution exposure in these communities.

Performance Measures

There is considerable attention given to performance measures in previous plans. However, it appears that the way the performance measures are applied is deceptive. There is no information on how they are weighted. They were only used to compare two very similar scenarios, and they were apparently not used to construct the scenarios.

The most significant performance measure in the 2015 plan is Greenhouse Gas Emissions. It is also used to distract and deceive. Reductions in GHG emissions resulting from state and federal actions are treated as if they are attributable to the plan. This distorts the comparison of alternatives and conceals the shortcomings of the plan.

The defined performance measures do not include vehicle miles traveled (VMT). VMT would be a much better way to evaluate alternative scenarios, since it is not susceptible to the distortion that affects GHG emissions.
**Project Evaluation Criteria**

The presentation at the start of the workshop indicated that the project evaluation criteria are already being used to select projects from the unconstrained plan for inclusion in the candidate scenarios. However, the public has not yet had an opportunity to review and comment on the project selection criteria. This seems backwards. You should make sure that the selection criteria are sound before starting to use them.

The project evaluation criteria have more influence over the final plan than the Performance Measures. They are used to prioritize projects and thus to decide which projects from the unconstrained plan are included in the revenue-constrained plan. This is also deceptive, because the evaluation criteria are different for different kinds of projects. Different criteria are used for highway, transit, and active transportation projects. Projects in different categories are not evaluated against each other. This implies that in selecting projects there has already been a division of available funding between transit, active transportation, and highways.

The fundamental balance is between transit and traffic. More transit equals less traffic, less transit equals more traffic. SANDAG has consistently tilted this balance toward less transit and more traffic. There is no information on how the split between highways, transit, and active transportation was determined, and no justification for it is given. This makes a mockery of the pretense that the performance measures and project evaluation criteria are driving the planning process.

In light of the new mandatory requirements, the approach used in previous plans is no longer acceptable. The metrics used, and how they are used, must support achievement of the mandatory requirements to meet greenhouse gas emissions and increase the mode shift to transit.

While greenhouse gas emissions are included in the project evaluation criteria, they are limited to 5 points out of 100, so they are effectively ignored. Even that minimal use of GHG emissions is skewed by the misleading application of GHG reductions not actually attributable to the plan. VMT would be a more accurate way of measuring the real impacts of selecting particular projects.

VMT should be used in the project evaluation criteria instead of GHG emissions, and should be much more heavily weighted. VMT should be used to rank all projects against each other, instead of limiting the ranking to projects in the same category. That will more fairly determine the balance between traffic and transit.

To counter the argument that ZEVs will reduce the importance of VMT, I suggest that any project that increases VMT be deferred until at least two-thirds of the vehicles on the roads are ZEV, and the electricity supply is composed of at least two-thirds renewables.

I urge SANDAG to take a step back and review the planning process before continuing to use the outdated and flawed planning process you have embarked on. You need to restructure the planning process to provide the public with real choices and meaningful action to deal with the challenges of climate destabilization.

David Grubb
760-753-0273
davidgrubb@sbcglobal.net
Appendix A. Excerpt from AB 805

SEC. 17. Section 132360.1 of the Public Utilities Code is amended to read:
132360.1. In preparing and updating the regional comprehensive plan, it is the intent of the Legislature that:
(a) The regional comprehensive plan preserve and improve the quality of life in the San Diego region, maximize mobility and transportation choices, and conserve and protect natural resources.
(b) The regional comprehensive plan shall address the greenhouse gas emissions reduction targets set by the State Air Resources Board as required by Section 65080 of the Government Code and include strategies that provide for mode shift to public transportation.
(c) The regional comprehensive plan shall identify disadvantaged communities as designated pursuant to Section 39711 of the Health and Safety Code and include transportation strategies to reduce pollution exposure in these communities.
(d) In formulating and maintaining the regional comprehensive plan, the consolidated agency shall take account of and shall seek to harmonize the needs of the region as a whole, the plans of the county and cities within the region, and the plans and planning activities of organizations that affect or are concerned with planning and development within the region.
(e) The consolidated agency shall engage in a public collaborative planning process. The recommendations resulting from the public collaborative planning process shall be made available to and considered by the consolidated agency for integration into the draft regional comprehensive plan. The consolidated agency shall adopt a procedure to carry out this process including a method of addressing and responding to recommendations from the public.
(f) In formulating and maintaining the regional comprehensive plan, the consolidated agency shall seek the cooperation and consider the recommendations of all of the following:
(1) Its member agencies and other agencies of local government within the jurisdiction of the consolidated agency.
(2) State and federal agencies.
(3) Educational institutions.
(4) Research organizations, whether public or private.
(5) Civic groups.
(6) Private individuals.
(7) Governmental jurisdictions located outside the region but contiguous to its boundaries.
(g) The consolidated agency shall make the regional comprehensive plan, policies, and objectives available to all local agencies and facilitate consideration of the regional comprehensive plan in the development, implementation, and update of local general plans. The consolidated agency shall provide assistance and enhance the opportunities for local agencies to develop, implement, and update general plans in a manner that recognizes, at a minimum, land use, transportation compatibility, and a jobs-to-housing balance within the regional comprehensive plan.
(h) The consolidated agency shall maintain the data, maps, and other information developed in the course of formulating the regional comprehensive plan in a form suitable to assure a consistent view of developmental trends and other relevant information for the availability of and use by other government agencies and private organizations.
(i) The components of the regional comprehensive plan may include, but are not limited to, transportation, housing, water quality and supply, infrastructure, air quality, energy, solid waste, economy, and open space, including habitat. Performance standards and measurable criteria shall be established through a public process to ensure that the regional comprehensive plan is prepared consistent with these measures as well as in determining achievement of the regional comprehensive plan goals throughout its implementation.
(j) Any water supply component or provision of the regional infrastructure strategy regarding water supply contained in the regional comprehensive plan shall be consistent with the urban water management plan and other adopted regional water facilities and supply plans of the San Diego County Water Authority.
Summary of Input Received at December 4, 2017 Public Workshop on Potential Performance Measures

The following is a summary of the comments heard at the workshop hosted by SANDAG. Participants provided feedback on the potential transportation network performance measures for San Diego Forward: The 2019 Regional Plan. Input gathered at the workshop is important to develop effective performance measures to evaluate San Diego’s future regional transportation network.

Comments are organized by the three Regional Plan goal areas. Input from the Spanish discussion table has been summarized and translated into English, and complete notes from the facilitated Spanish discussion are on the last page.

Healthy Environment & Communities

- Include a health outcome metric to measure obesity, asthma, etc.
- Consider looking at the unmet travel needs through the US Department of Transportation website.
- Separate the average travel time metric by mode — do not combine all modes for the travel time metric.
- Measure Vehicle Miles Travelled (VMT) within jurisdictions like how the jurisdictional Climate Action Plans (CAP) measure VMT, e.g., for transit priority areas.
- In relation to Key Question 9 (Is the region’s air quality improving?), consider how this measure affects the public: how many people are impacted by asthma? By cancer? Similarly, how many people benefit from improved air quality?
- Regarding Key Question 9, can we proceed further than state legislation (Senate Bill 375) and measure health outcomes/effects?
- Support for a VMT Performance Measure.
- Include a measure that addresses environmental justice and social equity.
- Include more background information in the Regional Plan about how certain performance metrics are defined.
- Key Question 7 (Does the transportation network support smart growth?) should measure distance by route access, as opposed to an as-the-crow-flies view to recognize topography and other boundaries to access.
- As we electrify, air quality should improve but public health is not necessarily being improved. Modify the key questions so that they are broader than air quality and address more health outcome measures/effects (asthma, obesity, cancer, etc.).
- Support for continuing to evaluate the disproportionate impact of an investment on disadvantaged communities.
- Data Collection: include self-tracking metrics. There is a lot of technology that allows the public to participate. Use apps to continue to enhance the walkability assessments and incorporating that data into the process.
- Set goals as standards for the metrics.
- Work with other regional partners (Caltrans, County of San Diego Health and Human Services, for example) to measure and monitor the plan.
- Focus on the under-served communities that are more at risk.
- Needs a new subsection called “Transportation Justice”.
Create a metric that looks at job creation, both in terms of direct jobs for infrastructure improvements and indirect jobs resulting from infrastructure that enhances the economic vitality of a community, as opposed to job access.

Include a metric that looks at accessibility of services and facilities for all.

Key Question 9 (Is the region’s air quality improving?): consider measuring at a regional level versus per capita.

Key Question 9 (Is the region’s air quality improving?): continue to monitor at a per capita level.

Commute mode share is a good metric to show actual use of facilities.

Add a question – Are we supporting a connected transportation network that preserves natural lands to support the Multiple Species Conservation Program by means of the jurisdictions’ climate action plan?

Support for a smart growth metric that measures our regional jobs-housing balance.

Key Question 8 (Is access to jobs and key destinations improving for all communities?): Access implies met needs, but what about the availability of transit?

Key Question 8 (Is access to jobs and key destinations improving for all communities?): Mileage, as opposed to measuring travel times by minutes, is the better metric. Align Key Questions 7 (Does the transportation network support smart growth?) and 8.

Measuring by minutes (travel time) and frequency are more quantifiable strategies. You shouldn’t have to check the bus schedule.

Include a measure to assess the economic impact of transit centers.

General support for pollutant reduction measures and for the inclusion of VMTs as a performance measure.

Congestion is irrelevant, measure VMT reduction and GHG impacts instead.

Can people access their destinations by bike within five miles?

No matter the mode, would like to be able to get a quart of ice cream and back before it melts.

Measure senior access to healthcare. How long it would take for a patient to get to doctor’s appointment?

What percentage of people are carpooling?

How many people are not driving alone?

Measure the Jobs/Housing fit

Jobs and where people live is not static, suggesting that the measurements ought to reflect future employment and housing areas.

Another participant responded, saying how a bus system is adaptable to changing job centers and housing needs since it is not on a fixed route.

Building public transit for future development is unwise because there may not be sufficient incentives to use public transit to warrant increased expenditure.

The draft performance measures do not consider the needs of different populations, particularly seniors and/or retired. People have different travel patterns in different stages of life; retired people are not commuting, which has an impact on the needs assessment of the transportation network. They have a choice to not travel at peak periods.

Measurement that the transportation network meets housing and low-wage jobs; too time-consuming for low-income individuals; difficult to getting to work.

Churches or other places of worship are difficult to access with the current public transit system, especially for seniors. One participant gave an example illustrating how difficult it is to travel from North County to National City to attend church using public transit.

Helpful to break into three groups (seniors, minority, low income) and by mode.

The facilitator clarified that the “parks and beaches” measure is not limited to Balboa Park or other destination parks or beaches; it also can refer to neighborhood parks.

How is ridesharing (Uber/Lyft) being measured?

Land-use is changing; how is that being captured in the measures?
• Suggestion that public transit should be more available for public schools.
• Transit agencies and planners cannot design public transit around the needs of individual schools.
• By learning from school district bus employees, MTS can create a more efficient bus system.
• The Regional Plan should discard smart-growth as a measurement and instead opt for VMT reductions per dollars spent as a useable metric.
• Expand the category of education to include K-12 for Key Question 8.
• Performance measures should relate to how well public transit is accessible to all geographies or places.
• The performance measures should take into account safe routes to school.
• Using the number of bus or transit stops as a metric for accessibility is insufficient; recommend that the performance measures include bus miles traveled. The availability of bus stops is a viable metric only so long as there is enough frequency to service the bus stops.
• Include two separate sets of performance measures: one for urban areas and another for rural areas. This is necessary to capture drastically different mobility needs, standards, and goals in urban and rural areas.
• Include sub-regional differentiation for performance measures, do a sub-regional analysis of air quality and equity pertaining to air quality.
• For Key Questions 9 and 10 (Is the region’s air quality improving? Are the greenhouse gas (GHG) emissions reduced?), it was suggested to include a measurement of absolute emissions as opposed to emissions per capita.
• Want to see connectivity mentioned in the draft performance measures.
• Include a metric for personal comfort for public transit.
• Include a metric “How many people are within a half-mile of public transit with a bathroom available?”
• Consider the number of assaults as a measure of safety.

Additional Comments

• Address public health (specifically the Hepatitis A outbreak) at the transit stop/station level by addressing cleanliness and the perception of safety.
• There is no public transit in Carmel Valley, Rancho Bernardo, and many nearby communities west of Interstate 15 and north of the Interstate 8.
• Support for emphasis on active transportation.
• Building more bus routes and public transit for future development will cause increased ridership in the future developed areas. People will not use public transit if they are not sufficiently incentivized to do so.
• Hepatitis A outbreak and insufficient bathroom facilities are both barriers to transit. The participant was under the impression that there were no plans for public restrooms for the Mid-Coast Trolley extension.
• Clarification is needed on why 20 minutes was selected for the performance measure “percent of population engaging more than 20 minutes of transportation-related physical activity” in Key Question 7 (Does the transportation network support smart growth?).
• Survey areas in which people are not taking public transit
  o Where do they go? Which days? What times?
  o Which bus could they take to commence their trip(s)?
• Public transit should be more accessible to disabled persons and recommended that there be audio as well as visual signs or indicators on public transit
• Recommendation that Caltrans’ Right of Way (ROW) be used for tiny houses or other shelters for the homeless.
• For the definition of employment centers, Horton Plaza was once a vibrant center, but now is not as vibrant due to Amazon. What effect will the decline in retail have on future land-use decisions and employment centers?
• It's interesting that the employment centers that are referenced in smart growth are those that exist today, but not a plan for the future employment. City Heights does not have much access to jobs.
• Cars traveling at 60 or 70 mph (fast speeds) are not conducive or hospitable to biking.
• Consider incentives for businesses to incentivize transit use. The university model that includes a transit pass within school tuition is a useful structure to address this item.
• Consider partnerships to provide youth bus passes. Provide clean amenities at transit stations.
• Homeless issue: Address safe bike connections between transit stations.
• Consider facilities for homeless people.

Innovative Mobility & Planning

• The question “Are transit times reduced?” doesn’t address whether there is adequate transit within a community to connect them to the more transit saturated places.
• There is interest in improving community connections to the transit systems. For example, Rancho Bernardo has a new community college opening and community members have expressed concern over not having transit support for the influx of people. This goes beyond looking at the question “how long does it take to get there?”
• The travel times metric is important, and we do need to take it into account.
• Consider comparative travel times (transit vs. car).
• Something that may also be valuable is distance. Are people making shorter trips via transit? Longer trips? There is often a greater distance to serve in San Diego in terms of origins and destinations. The physical locations of destinations are very dispersed. Public transportation requires lots of intermediate stops, which contributes to making it slower than automobiles. Dispersed origins and destinations also make it hard to synthesize the system. Once we see distances reduced (e.g., distance from work to home) the system can become stronger. This could be a side metric related to trip times.
• For public transit to work, it must be convenient, quick, and cheap. A North County resident who uses the COASTER has found the COASTER doesn’t meet any of those three criteria. Light rail might help if it went past UCSD up to Oceanside.
• Funding and costs of doing projects is an issue that was not in the performance measures.
• “Are travel times reduced?” is not a good question, because it could be looking at a reduction as small as a minute or two. This member would rather know if times across the board of biking/driving/transit have been made similar enough to help people make decisions across modes. This measure should be about ensuring all modes take the same amount of time to get from one place to another – and then it is just up to the user to weigh the decision of paying the gas/parking/transit fare. “Reduced” travel times doesn’t seem like a tangible goal to this member. So, for example – a question here could be “Are travel times the same across all modes?” or “Can travel times be reduced significantly (e.g., by 20 minutes, 30 minutes)?”
• The Community-Based Organizations partnering with SANDAG have had discussions of wanting to expand the safety performance measures to include public safety on transit. Don’t just measure vehicle crashes/fatalities types of safety, include public safety at transit stops, rates of crime/violence/ etc. at transportation hubs.
• In response to “Are more people walking/biking/sharing rides?”, a group member noted that carpooling had not come up in the conversation, and suggested that this was an indicator that the group was more interested in walking and biking than ridesharing.
• Walking, biking, and transit are usually the modes that are connected to each other. Performance measures should address reducing single-occupancy vehicles, but prioritize walking/biking/transit first, and then measure carpooling separately, as a different measure of reducing single-occupancy vehicle use.
• How the measures were weighted – reducing VMT and increasing bike/walk transit important, so it is important to know that these are weighted appropriately and weigh into decision making process. SANDAG staff responded that the measures are not currently weighted.

• Safety should be measured beyond just crashes – periodic surveys of users would help with input into the feeling of safety since it isn’t as tangible of a measure.

• In terms of the “Is the current transportation system being maintained?” measure – all the questions seem to be focused in the moment and less on the future. Would like to see “Are new communities being served?/Are we expanding adequately?/Are we studying population density and connecting growing populations to existing lines?” as examples of forward looking measures.

• Measure expansion, not just maintenance. The Mid-City Centerline took 35 years – at some point it had to be identified that City Heights was a big enough community to need a transit line. The Regional Plan should be looking at how the communities have changed and their future needs. For example, Pacific Beach has a very driving-based culture currently, but will they want to take more transit in the future?

• Do routes adequately connect people from where they live to where they work?

• Concern about the park and rides – whether it be for bikes, cars, etc. there is a need for more park and rides. This will reduce traffic. Should be well lit with surveillance cameras; bathrooms would be nice. The theme of safety and unsafe pickup areas was reiterated in relation to park and rides.

• Mobility choices should also include complete streets – such as measuring how many new streets being developed are utilizing complete streets ideas. SANDAG staff suggested this being phrased as a measure accounting for how miles of complete streets are being built, and the member agreed.

• Land uses have changed over time, and people are moving outwards because of affordability. People are leaving the urban core. People are further from their destinations right now, so it’s a struggle to reduce travel time, but getting people from outlying areas that aren’t used to transit onto transit should be looked at in performance measures. There has to be a look at what connections are available in the outer lying areas.

• Land use planning and housing should be done by SANDAG. A performance measure should look at mode share and use – if something’s too dangerous, it won’t be used. Does the safety change behavior? Does it encourage a community that biking/walking is safe enough to do? Simply saying a street is designed to be safe may not change the community’s perception or actions.

• Safety is a perception issue – if transit is busy, it will be safer.

• The new requirement from AB 805 – that there be a strategy for increasing mode shift to transit - was not imposed on any prior Regional Plan. This should be recognized explicitly in the performance measures as it is imposed by law. This should be separate from the other performance measures.

• Telecommuting should have its own performance measure outside of the travel time measure.

• Separate travel time reduction into more questions. There should be a question like “Is time on transit reduced?” It could be easy for car data to dominate the travel times data; separate out by mode.

• Regarding “Is the current transportation system being maintained?”, participant didn’t like using percent of investments as a measure. Putting money into something doesn’t mean it’s being successfully maintained.

• In looking at Key Questions 2 and 3 (Are more people walking, biking, using transit, and sharing rides? Is the transportation system safer?), an important step is to build out the Regional Bike Network committed to through the Regional Bike Plan Early Action Program. “Miles of facilities built” could be a measure.

• Take measures from bike plans of the City of San Diego, County of San Diego, etc., and ask if the Regional Plan is supporting the approved bicycle goals and plans from other jurisdictions. “Accounting of progress towards local bike plans” could be a measure.

• The City of San Diego’s Climate Action Plan has a mode share commitment, so it would be good to measure if this is reflected by the Regional Plan.

• It was noted the measures had no specifics about seniors or their transportation needs. SANDAG might want to consider a specific question/measure around this.
• Interest in looking at needs of those with disabilities, children, and caregivers of any of these groups.

• Clarification on “Is the current transportation system being maintained?” was asked for – is this maintaining the system the way it is now, or is it considering ways that the system may be changed, which might entail not investing in maintaining certain aspects of the system? What is needed is a more itemized look at where money is going, such as how many roads are continuing to be maintained.

• A lot of transit is not accessible as it requires having to walk a long way and cross streets, etc. Would like to have a metric which takes the major destinations of the region, and measures how many are accessible by transit within a quarter mile.

• Comment building off access for elders – look at access for children. Many parents take their kids to school during the days which increases traffic. Look at trends of current society – e.g., removing school busses – as areas to address.

• In looking at shared systems and how to encourage biking, it was suggested that transit be moved off the ground by skyways/gondolas and other new transportation methods. These are quiet, low pollution emitters.

• Measures should not just look at fatalities but at what kinds of incentives would get people out of cars. For example, someone could survey school children to see what would get them excited about using transit. There should be a focus not just on those already using the system but also those interested but not using it yet.

• An interest in looking at shifts in health data was expressed - shifts in health indicators might help show that more people are using active transportation over time.

• The word “independence” was suggested for use in a question addressing serving seniors/disabled passengers/youth - using transit independently underlies the needs of all of these groups - “Independent mobility for all populations”.

• How many employers are offering transit perks that are equivalent to the more common free parking perks? Some employers are incentivizing transit use in this way. This would entail a survey of major employers to find out how many would be willing to make the switch to incentivizing transit. Free parking spaces are an incentive to drive currently. Want a metric that that tracks transit incentives and participation.

• Key Question 3 (“Is the transportation system safer?”): there should be a measure concerning safety on transit and at stops, how safe people feel using transit as well as monitoring incidents around transit stops.

• Break car and non-car related modes out in Key Question 2: Are more people walking, biking, using transit, and sharing rides?

• Suggested new measure: “Is the existing system/future system accommodating to bicycles?” Asking if more people are biking doesn’t necessarily answer if the system is accommodating to biking. Look at miles of bikeway being built.

• The existing travel times measure doesn’t measure “transit frequencies” Every route should be measured for frequency under different scenarios and the frequencies could be averaged by network as a performance measure to determine which scenario provides the highest levels of transit service.

• Reduce VMT to reduce congestion and greenhouse gas emissions – VMT is the most significant measurement of all proposed measures.

• Do not lose sight of “level of service” metric (wait times/delay).

• Last mile - what’s a good metric?
  o 1 mile walk doesn't consider topography of the walk.
  o Incorporate metrics such as percent of investments used on complete streets, especially walking improvements such as cross-walks near transit stations to facilitate access from transit stations to nearby destinations.

• Existing draft of performance measure references half mile, but quarter mile is a better measure for seniors, disabled, and business people.

• Support stabilizing climate at livable level.
• How are these projects being equitably distributed? Historically certain communities have been continuously negatively impacted by projects. How can we measure that equity of distribution of positive/negative impacts? (Potentially broaden Key Question 4 (Is the current transportation system being maintained? to include disadvantaged communities and distribution of transportation investments) – e.g., percent of overall investment bringing new or improved transit services to disadvantaged communities?
• Prioritize safety with your metrics, including perceived safety.
• SANDAG needs further demographic study on transit usage (Mid-Coast Trolley) - transit serves different demographics (workforce, business, students, seniors). How will various modes be used by different demographics (who rides transit and for what purpose)? Incorporate a greater demographic breakdown into the transit usage performance measures.
• Look at VMT over time and cumulatively.
  o Road use cost - don't make it a regressive tax (tax on the poor).
• Include a metric on the distribution of average daily trips among all travel modes
• Are there measurements for people with disabilities? (Is the model capable of that level of detail?)
• Change Key Question 1 “Are travel times reduced?” to “How are travel times impacted?” (more open-ended questions, less yes/no questions)
• Ensure that Transit Oriented Development (TOD) efforts include lower-income, not just focused on high income business class. How can we measure if equity is built into these measures?
  o Where are people going regularly (by demographic?) - and is the network serving them well, is it prioritizing certain trips? (similar to Key Question 8. Not just how close to destinations, but how well are those destinations/areas served - measure not just by car. Multimodal measurements (e.g., average travel time for disadvantaged communities versus non-disadvantaged communities)
• Is the transit system safe? Measure perception of safety (sexual assault); Add metric related to percent of investments that go toward safety (e.g., amenities that provide safety such as lighting, sidewalks, access to the transit station from nearby streets)
• Measure access - if transit exists and serves an area, is it accessible (e.g., Oceanside platform very long, hard for seniors and disable to walk to) - number of seniors and disabled in the service catchment area and how many actually use it as a measure?
• How is the model incorporating disruptive and future technologies (automated vehicles, connected vehicles, electric vehicles)? Are the performance measures capturing these investments?
• Peak travel time doesn't capture commuters in the off-peak. How are they affected (often low-income)? Equity issue.
• Modal measures are broken down by demographics (is this a choice or a necessity?)
• Disaggregate SANDAG travel maps that show percent of population that can access certain locations within certain timeframes - don't include public transit with cars on the maps, otherwise, the timeframes are too optimistic. Separate out the modes of transportation.
• Interest in expanding transit accessibility measures where transit does not already exist, such as North County.
• Separate metrics measuring travels by specific modes, i.e., public transit, private vehicle, active transport etc.

Additional Comments

• Traffic circles reduce congestion, climate impact. Incorporate more traffic circles into the plan.
• Travel time - better coordination of schedules; size of buses (articulated buses)
• Concern that SANDAG doesn't listen to feedback
• The transit system is too focused on commuters (work), but not enough to serve everyone (connecting to other community uses e.g., discretionary trips)
Those who would voluntarily use public transit are discouraged to do so because it takes so long. Transit often takes more than twice as long as it would to drive. This makes it hard to encourage someone to get out of their car and start taking transit.

The last mile is often a barrier. For example, it is helpful to get on Rapid services to get to major destinations more quickly, but there is need for innovation around the last mile and to incorporate more individualized type methods for the last mile (e.g., an Uber waiting station at a major transit stop). This would require parking at those areas, etc., depending on solutions being employed.

Transit would be a more attractive option if it were more readily available. The Mid-City Centerline project took 35 years – the length of time it takes to get a project developed can be a concern in how quickly something that is planned becomes available to the community.

Don’t have a Rapid stop at a transit center in the center of a freeway with no connections – why not continue to have buses/trolleys/etc. connect to this location to help people navigate the last mile?

How are organizations and cities using strategies to lower car use? The Mid-City push to get free bus passes for high schoolers was cited as an example to consider. Ideas like this can switch the norm to get kids excited about getting a free bus pass at a certain age instead of a car. Strategies to change these mentalities are needed.

The Rapid routes were praised as an example of reducing travel times into downtown significantly.

Having more biking/walking facilities alongside transit was suggested. This would help community health and environment as well.

Provide shuttles or routes like the SuperLoop to pick up riders alongside transit to help solve last mile issues.

SANDAG was sued for a RTP 10 years ago, at which time a group from the outside came to San Diego to try to analyze the transit system. That’s the last time outside folks came in. The urban area transportation strategy that came up then has not been implemented by SANDAG.

The City of San Diego Climate Action Plan calls for 50 percent mode share. How do we get there in the next 10-15 years? Currently, use is under 10 percent for modes other than driving. A concept that experts came up with is that the urban core be an area which corridors feed into efficiently/effectively/affordably. Within the urban core you shouldn’t need a car – that’s doable within 10 years in the budget that exists if it’s a priority. Likes the idea of getting away from the idea of congestion relief, and suggested the goal should be to reduce VMT. Train travel is 17 times safer than car travel. Bus travel is safer, as well. Safety has to do with getting people out of cars.

The Transit Optimization Plan from MTS will take away transit access for lots of people.

Outside of youth, adults who are habituated to driving also need to learn to think of using transit differently. Looking at this might include asking: What are companies doing to incentivize employees to use transit? Are there innovative ideas that can be used? Are they letting people work at home?

Outside agencies should participate in modeling, as well as SANDAG, staff to allow for diverse perspective when it comes to modeling.

Many children in communities of color are undercounted in census data. Staff could emphasize the importance of the census while outreach is happening around the Regional Plan.

MTS optimization plan - travel times measured by bus stop A to B; MTS eliminated stops near health centers (like Walgreens). Reducing the number of stops along a route means additional time needed for transfers and walking - incorporate that into ‘travel time’ metric calculation. Also incorporate “waiting time” for transfers and headways.

What investment have we made in the Regional Plan? Can we be flexible with projects as technology evolves?

Work to improve frequency of COASTER (double track and electrify the entire corridor).

- Move money from widening I-5 to improving frequencies and speeds on the COASTER.

Are we looking at private parking lots for transit usage, not just formal Park & Ride lots? How do we know where everyone is coming from?
• Have a transparent process for improving modeling - what are performance measures, how will they be measured, and how does the model work? How do we know that the modeling issues were fixed?
• Implement congestion pricing to reduce VMT, similar to other countries, and improve the way we pay for parking and use roads.
• Central to idea of innovative planning - where do SANDAG’s unconstrained projects come from? Are other projects being frozen out? This process locks out new, innovative projects (like new network designs).
• Gondola/skyway system to help with beach traffic in the summer time (across the San Diego river to Pacific Beach, etc.) - innovative ways to address congestion to and from coastal areas.
• How does the regional planning effort interact with other planning efforts (like Vision Zero)?
• Regional Plan outreach workshop is not engaging across all communities (not accessible to low income, minorities) - public participation process.
• Using transit officers as outreach opportunity to homeless people.
• Create better pedestrian access to stations (look at Seattle and Portland - creating pedestrian and bike bridges not used by cars. Creating safe spaces for non-motorized traffic).

Vibrant Economy

• SANDAG should analyze the percentage of transit trips to the airport.
• The Regional Plan should measure access to jobs, delivery, and freight and determine if transportation investments provide access.
• SANDAG should work with businesses to determine how many employees use transit for the commute and the workforce’s ability to get to work.
• Truck travel times will become more important as more goods are delivered directly to homes rather than retail.
• Partnerships should be formed with businesses to provide transit passes for employees. A metric for consideration could be the number of partnerships formed.
• Access to jobs within a community should be measured, and the current questions do not address this. Smart growth housing is being built, but where will new residents work? Investments are made in these communities, but there is no incentive for jobs to locate near housing. Vibrant communities are places where people can live, work, and play.
• SANDAG should study where people live and where they work. Apps can determine where people are commuting by bike and point out “hot spots” which show riders where the safest route occurs. This could be expanded to cars as well.
• Quantifying an individual’s transportation on transit can be difficult. Coordination between agencies is needed. Companies like FedEx and UPS can track packages very well and school districts can reroute buses when needed. Delivery companies are always finding ways to ship cheaper and faster, so a conversation with them would be helpful.
• Transportation investments improve the economy, but what metric is being used, who’s benefits are assessed, and what does “reliable” transit mean? Suggest looking at overall effectiveness. Measuring congestion should be replaced by reducing vehicle miles traveled.
• Add metrics based on generational use of transit.
• The “first mile/last mile” relating to origins and destinations not served by transit often are not measured, but should be.
• Track the economic development around transit hubs.
• Support for percent of income metric
• Metric on different levels of jobs such as minimum salary.
• Goal metric or target to different level of employment types or rather higher salaries.
- Number of employers that incentivize mass transit.
- Would be interesting to see the trend lines relating to these metrics.
- Would like to see travel times to and from Mexico.
- In general, would agree with Key Question 5: Do the transportation investments help to improve the regional economy?
- Reliability is a key metric, especially as it relates to transit.
- Why are we measuring “percent of VMT” and not simply “VMT”?
- Support for these metrics being quantified by goal targets.
- For truck travel time reliability, include other freight modes (i.e., rail, air, water etc.).
- Suggestion to define the Performance Metric better.
- Driverless car, bullet train other technologies that people have to navigate and cross to get to their destination. One idea is to bury them underground. People know not to cross freeways, but not the same for rail/mass transit.
- Consider how to evaluate job creation
- Could look at the federal grant program, New Starts. Would be interesting to compare how many people who move or move businesses to San Diego versus those that move out of the region.
- Single Occupancy Vehicle versus Transit Autonomous Vehicle Use.
- Include jobs in the Vibrant Economy goal area, in addition to Healthy Environment and Communities goal area.
- The Jobs metric in the Healthy Environment and Communities goal area, still do not have number of jobs, types of jobs, income level, etc.
- Key Question 5 (Do the transportation investments help to improve the regional economy?) seems like a yes/no question. Not very telling as written. Would like to know how the planned projects have impacted the local economy. Rancho Bernardo Transit, George Cook Parkway. It would be good to go there and see if that transit improvement helped the community.
- Questions the Travel Time Reliability Performance Measure regarding new legislation. Presumes freight by truck is most important, but that may not be the case in our region, should include other freight modes.
- Take into consideration negative health impacts as costs to different vehicle use, freight trucks etc.
- Look at amount of each dollar spent that stays in the region versus portion that leaves the region.
- Cost of transportation as a percentage of family income.
- Cost of housing as percentage of family income. Especially now that SANDAG has to work with housing.
- Many of the requests fall into the Cost-Benefit ratio. Perhaps breaking that apart to see the relative impact on different planning aspects (air quality, housing, jobs, etc.)
- Question on how much importance will be given to the federal Performance Measures?
- How do we define a transportation investment? Versus a transportation improvement?
  - Investment is a bigger picture
  - Improvement is slight bettering
- Suggest updating Key Question 6 “Are the relative costs of transportation changing similarly for all communities?” to “Are the relative costs of transportation changing equitably for all communities?”
- General confusion as to how a regional economy would be measured.
- Interest in breaking down costs of transportation on a smaller scale, such as by type of transit, rather than as one general classification.
- Not enough electrified transit options.
Additional Comments

- Studies find that the speed by which a company manufactures goods and gets them to consumers is more important than cost. Companies are going to vendors for speed, rather than cost, so we need to help communities get industry into their areas by providing a transportation system that can move goods out.
- Car ownership and transportation has a cost. Communities without cars need to be served by public transit. Fares can have an impact on disadvantaged residents for those who rely on transit.
- SANDAG should consider the global implications of the Regional Plan. On the Mexican border, we can only control one side, and with improvements to San Ysidro and Otay Mesa entry points and the Port of San Diego, products will continue coming over the border. Goods movement is limited by inefficient transportation systems, so integration is needed. Political components also play a role in places like Barrio Logan. The maritime industry provides higher paying jobs, so the without shipyards, the alternative may be lower-paying jobs.
- San Diego Bay has been classified for mineral resources. To promote the economic development, mining the Bay and tidelands reclamation would maximize a resource in San Diego. Could also provide new underground spaces for transit to the Airport. SANDAG and the Airport should discuss using money from the Airport on off-site transportation improvements.
- Underserved communities and immigrant communities should receive transit subsidies while attending school and bettering their lives. Access to jobs can sometimes mean going to places like Sorrento Valley, where Coaster passes are even more expensive. Refugees should receive subsidized transit fare for five years to help with school or work.
- Communities overburdened by transportation costs should not see a similar increase in transportation costs as other areas.
- Safe Routes to School programs should be expanded to adults. Costs of Rapid buses or transportation to Sorrento Valley can be expensive for minimum wage workers.
- SANDAG should determine where transit bottlenecks occur, causing riders to be late. The lack of reliability in the transit system causes a time penalty for those who use it to commute. Excessive transfers also are an issue.
- The transit system does not run 24/7 making it unreliable for employees who do not work traditional hours.
- The SPRINTER and COASTER need to be double-tracked, electrified, and have more frequent service. Inviting more people to use transit will make it work. Shuttle systems from transit to employment areas have been successful in other areas.
- Residents without smartphones may not have information about transit. Bus stops do not identify where the bus is going and it can be difficult to know the exact stop near a destination. Map consolidation and new apps can help.
- The green initiatives are not discussed. Idea that economies grow when people think green, green jobs/employment and affect transportation/transit.
- Link transit hubs to what is there now so the rider knows where they are arriving.
- Job and housing balance, example of people commuting from south bay to Sorrento valley
  - What can cities do to get jobs that people are commuting to out of the jurisdiction?
- Millennial generation does not want to drive. Health and quality of life improve when not driving. An improved transit system can attract talented Millennials. Improvements to transit in New York, San Francisco, and Portland including safety for bike riders and sustainable transit is working.
- What goods are being transported via rail, shipping, and other freight modes? How much comes from out of state versus from within the region?
- Externalities (air quality) and operating expenses are less with Electric Vehicles (EV). Supporting EVs helps reduce transportation costs, environmental costs, costs of living.
- Some facilities don’t allow for pedestrian crossing-- lack of sidewalks, unsafe therefore people are forced to use vehicle or transit.
Resumen de los comentarios obtenidos el 4 de diciembre de 2017
Taller Público sobre Medidas de Rendimiento Potenciales

A continuación se encuentra un resumen de los comentarios que escuchamos en el taller que SANDAG organizó. Los participantes comentaron sobre las posibles medidas de rendimiento de la red de transporte para San Diego Forward: El Plan Regional 2019. La información que se obtuvo en el taller es importante para el desarrollo de medidas de rendimiento efectivas para evaluar las futuras redes de transporte regional de San Diego.

Medio ambiente y comunidades saludables

- ¿Apoya la red de transporte al crecimiento inteligente?
  o Sugieren una métrica que incluya a los niños que caminan a la escuela
  o También sugieren separar a los de mayor edad que tienen que viajar (al doctor etc.), que necesitan esperar a los autobuses
  o Ejemplo de City Heights: es muy difícil para que los estudiantes lleguen a la escuela
    ▪ Métricas específicas sobre los jóvenes que usan autobús para llegar a la escuela
    ▪ Medida enfocada en gente que usa transporte público pero que no es parte de la fuerza laboral
  o Dieron un ejemplo de estudiantes de National City que viajan a City College en vez de Southwestern porque no hay modos de transporte seguros en dirección a Southwestern
    ▪ Métrica enfocada en acceso al transporte para gente con discapacidades
    ▪ Se sugirió separar la distancia recorrida en promedio por tipo de transporte
    ▪ Pregunta sobre cómo se usarán las métricas para comparar impactos regionalmente. El norte del condado no tiene iguales tipos de transporte público. Si el uso de transporte público es menos en el norte, ¿cómo se van a poder aplicar las métricas en los dos?

- ¿Está mejorando el acceso a empleos y destinos principales para todas las comunidades?
  o Sugieren que se diferencie entre cada tipo o modo de transporte (porcentaje de la población a 30 minutos del trabajo y centros de educación superior)
    ▪ Sugieren separar el transporte no motorizado, sin incluir viajes compartidos en auto

- ¿Está mejorando el acceso a empleos y destinos principales para todas las comunidades?
  o Creen que esta métrica es importante
  o Hay demoras para cruzar la frontera de norte a sur. El tráfico causado por la fuerza laboral de Tijuana que trabaja en San Diego dificulta que el público general tenga acceso a viajes con tiempo razonable en dirección a Tijuana
  o Sugieren que las métricas midan más como las bicicletas agregan o ayudan al transporte no motorizado (tiempo, rutas etc.)

- ¿Está mejorando la calidad del aire en la región?
  o Todos creen que es importante porque hay más enfermedades causadas por la calidad del aire
  o Si esto va a ser considerado, quieren que el enfoque sea no solo en medir la calidad del aire en general, pero también en comunidades con menos apoyo
o ¿Cómo se puede medir la calidad del aire en comunidades que tienen peor aire? Si lo combinan todo o lo miden en área general, no representará bien a las áreas con más problemas de salud.

- CalEnviroScreen ayuda a identificar comunidades más afectadas por la calidad del aire
  - Sugieren una métrica que separe las rutas de carga de los otros transportes y monitorear los camiones de carga que no se trasladan en rutas designadas para camiones

- ¿Están disminuyendo las emisiones de gas de efecto invernadero?
  - Sugieren medir emisiones a lo bruto, no per cápita
  - Preguntan si se analiza cómo la frontera y la espera en la frontera afecta a la gente por el smog
  - ¿Cómo se va a medir la salud pública de la gente que vive junto a una autopista?

**Movilidad innovadora y planificación**

- ¿Disminuyen los tiempos de viaje?
- Ejemplo: National City está localizado centralmente y tiene mucho acceso a transporte público y autopistas. La información sobre los tiempos de viaje lo tienen en línea, y el tiempo está estabilizado. ¿Cómo van a comparar de aquí al 2050 (modelar etc.)?
- Opinan que esta pregunta depende de los proyectos. Creen que esta pregunta es redundante.
- Sugieren: ¿Cómo quieren ver la ciudad en el futuro?
- El tiempo viajado depende de las otras preguntas
- Es importante diferenciar entre los diferentes medios de transporte. Es más importante enfocarnos en los medios de transporte público
- No hay rutas donde viven las personas que no tienen bicicleta, no todos tienen modos de transporte
- Sugieren que se incluya si las rutas van a dar servicio donde no hay. ¿Cómo se agregaran servicios?
- Agregar algo relacionado con: competencia cultural
- La primera pregunta es importante
- En hora pico es más difícil disminuir el tiempo. Saben de las propuestas de nuevos caminos con cuota
- ¿Hay más personas trasladándose a pie, en bicicleta, usando el transporte público y compartiendo el viaje?
- Se debe separar los viajes compartidos de los transportes no motorizados. Es mejor para el medio ambiente el transporte no motorizado, y viajes compartidos no lo son. Si se combina, esto no es representante de lo positivo que hace un modo de transporteación y el daño que causa el otro
- ¿Es más seguro el sistema de transporte?
- Tenían gran interés en accesibilidad para personas que no tienen acceso, en específico gente con discapacidades. Quieren que la métrica incluya la seguridad de esta gente
- Sugieren ver lo que hacen las ciudades que tienen infraestructura para ayudar con acceso
- Las estaciones de transporte público no son seguras, ¿cómo van a medir si no están cambiando o midiendo los factores que afectan la seguridad y la equidad de transporte?
- ¿Recibe el sistema de transporte actual el mantenimiento adecuado?
- Quieren diferenciar entre cada tipo o medio de transporte porque tienen diferente peso
- ¿Cómo vamos a reflejar la tecnología inteligente, automóviles independientes, etc.?
- Las medidas están bien, pero quieren ver más sobre equidad.
• Los choferes no quieren hablar con los que no hablan bien el inglés, o los hacen sentir avergonzados por su falta de lenguaje. Esto causa que los que necesitan usar el medio de transporte no lo hagan
• Quieren más educación de los choferes en diversidad cultural
• Los Trolleys no son seguros, hay peleas, o hay situaciones que cambian la imagen de uso
• Entre más gente usa el transporte público, más seguro se hace
• Hay vías alternas de emergencia señalizadas en áreas como en La Jolla, pero no hay ese tipo de información en otras áreas de San Diego. Eso es importante para la seguridad.

Economía vibrante

• ¿Ayudan las inversiones en transporte a mejorar la economía de la región?
• La métrica sobre el porcentaje de ingresos gastado en transporte es muy importante porque ayuda a las personas de bajo recursos
• Pedido de clarificación ¿Cómo se mide costo-beneficio en transporte?
• ¿Se va a medir el impacto de construcción o el impacto en el medioambiente? Ejemplo: hay muchos arroyos en National City. Están construyendo cerca de los arroyos. ¿Dónde se va a medir el impacto? ¿Cómo se va a medir el costo al ambiente y en la tierra con todo el desarrollo?
• Hay muchas preguntas sobre cómo se va a modelar, pero no hay mucha información sobre el modelo. ¿Cuál es el peso o la ponderación que se va a dar a cada variable o parte de la métrica de costo-beneficio?
• ¿Cuál es la “economía” de la región?
• ¿Están cambiando de forma similar los gastos relativos de transporte para todas las comunidades?
• Sugieren que se incluya una métrica sobre el impacto ambiental (¿Incluir en el EIR?)
• Sugieren una métrica sobre el impacto económico
• ¿Cómo se distribuirán los fondos con equidad? ¿Cómo reciben fondos las comunidades diferentes? ¿Con cuál métrica se decide?
• Si no está claramente dicho, ¿cómo van a poder ver o mantener en seguimiento
<table>
<thead>
<tr>
<th>No.</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Healthy Environment and Communities: Nothing is less healthy than human extinction. That is where we are headed. Light Duty Vehicles (LDV's) emit the most GHG of all categories. For LDVs to support climate stabilization we need more fleet efficiency and less VMT. VMT is SANDAG's responsibility. Top 3 PM's: 1.) VMT Reduction 2.) VMT Reduction 3.) VMT Reduction.</td>
</tr>
<tr>
<td>2</td>
<td>I strongly support electrification of LOSSAN Corridor, to increase frequency and decrease emissions. I also support extension of the SR-56 bike path under I-5.</td>
</tr>
<tr>
<td>3</td>
<td>Vibrant Economy, how do we measure 'improvement in the regional economy'? Are we looking at overall cost of transportation (cars are, by public investment and cost to users, the most expensive mode) and the economic impact of increasing, or not, bike/walk/transit? Congestion should no longer be a performance measure—VMT reduction, GHG reduction, and bike/walk transit mode share should be prioritized. What's the definition of disadvantaged communities? Low income, minority, senior disabled.</td>
</tr>
<tr>
<td>4</td>
<td>Include the concept of generational (e.g., millennials) preference in transportation and land-use patterns. This is also a huge economic driver for relocation of profitable companies (e.g., Amazon). This could translate to loss of human capital of very talented individuals.</td>
</tr>
<tr>
<td>5</td>
<td>Vibrant economy measures: Does the project improve sales at local businesses? Does the project support ecotourism? Is the project a collaborative effort with city, community, and other stakeholders? Cost analysis of project to public and environment health and future liabilities? * pens did not work well—all only got a few writing.</td>
</tr>
<tr>
<td>6</td>
<td>Thank you for creating the space for consultation and reflection of potential performance measures. One suggestion for the future is to take the time in break-out groups to clarify and define each of the potential measures and try to build on them/clarify them so that members in the discussion can stay focused on the measure rather than sharing anecdotes on their own hopes for the transportation plan. But hearing people’s anecdotes were helpful too! Thanks!</td>
</tr>
<tr>
<td>7</td>
<td>Vibrant Economy: Cost per mile traveled, by any mode and by specific individual modes. Affordability of commute—comment: $2.50/1 mile ride no transfer is too much).</td>
</tr>
<tr>
<td>8</td>
<td>Healthy Environment: Number of vehicle miles actually traveled by mass transit equipment. - Money Spent for public transit/ money spent for highway construction and MTCE. Measure the safety of transit: number of assaults, number of hours patrolled by law enforcement.</td>
</tr>
<tr>
<td>9</td>
<td>It's good that SANDAG wants to hear from a wide range of our San Diego population representatives — good to start— now take comments into smaller working groups based on groups that have similar needs and requirements of those groups for more ideas. Thank you for starting this.</td>
</tr>
<tr>
<td>10</td>
<td>Thank you for hosting today’s meeting. Please consider incorporating the following comments: for vibrant economy include creation of jobs that pay a livable wage and utilize skilled and trained workforce. Please separate question 1.A. by mode, challenges to carpooling, and walk/bike/ mass transit are very different. For question 9.A LGt’s measure smog-forming pollutants at regional hotspots. Keep question 6.A in there; cost is important. Keep question 7.D in there; active transportation and public health is key. For 5.B. lets measure port/ail transit times. Glad VMT is in there. Let’s elevate that.</td>
</tr>
<tr>
<td>11</td>
<td>Please implement public transportation in the large area of North County that lacks transit: Carmel Valley, Del Mar Heights, Pacific Highlands Ranch, Black Mountain Ranch, Del Sur 4S Ranch, Santaluz, Fairbanks Ranch, Del Mar Mesa, Torrey Highlands, etc. Also west side of Ranch Bernardo west of I-15.</td>
</tr>
<tr>
<td>12</td>
<td>Measure frequency of all routes/services/modes. Measure split of ADTs among private autos, and all modes of public transit. How will performance measures be measured? Faults in SANDAG’s analyses/computerized models.</td>
</tr>
<tr>
<td>13</td>
<td>Bus performance measures: Metrics- transit travel time not just point-to-point for a vehicle but also walking time, wait times for transfers. Community service access metrics- identify key community destinations-government offices, schools, hospitals, libraries, parks, bases, senior places, clinics, etc. Measure how many are served by transit within a quarter of a mile walk and with 1 day and all day services. Bus access to destination metrics related to complete streets. How many buses stop at safe crossing places for key community destinations, how many don’t.</td>
</tr>
<tr>
<td>14</td>
<td>Innovative Mobility and Planning- A vision is nice, but there should have been a requirement to support climate stabilization. However VMT-reduction is a performance measure that solves other problems beside climate stabilization (Note: fleet efficiency is the responsibility of the state, not the MPO, like SANDAG) Three top PM’s: 1.) VMT reduction 2.) VMT Reduction 3.) VMT Reduction.</td>
</tr>
<tr>
<td>15</td>
<td>(1) More bus stations (to bridge the gap between one station and the other) so it’s more convenient for pedestrians. (2) Shorten the time between the trips (from 1 hour to 30 minutes, from 30 minutes to 15 minutes, etc.). (3) More chairs at the bus station and have a cover it (the bus station) and the chairs should be small, it does not need to be big.</td>
</tr>
<tr>
<td>16</td>
<td>More sidewalks for pedestrian exercise. More lights for easier driving and walking.</td>
</tr>
<tr>
<td>17</td>
<td>(1) More bus stations. (2) Having chairs at each bus station. (3) The chairs at the bus station should not be too close to the road. (4) Having the covers for bus stations. (5) More 44 buses for the Linda Vista route.</td>
</tr>
<tr>
<td>No.</td>
<td>Proposed Key Questions</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Do a measure (performance) on the Rancho Bernardo Transit Center better/worse economic value to area it serves.</td>
</tr>
<tr>
<td>2</td>
<td>Question 6, “similarly” should be changed to “equitably.”</td>
</tr>
<tr>
<td>3</td>
<td>Wonderful questions, these are important topics to consider.</td>
</tr>
<tr>
<td>4</td>
<td>Include the community outreach and how they (or we) can access to that information.</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Hard to express.</td>
</tr>
<tr>
<td>7</td>
<td>Commitment to safety and shifting modes for increased bike/walk/transit dependent upon building out of regional bike network (early action program) committee to buildout some!</td>
</tr>
<tr>
<td>8</td>
<td>Transportation system safer? Are facilities correctly lit. Are there enough enforcement officers? Are camera’s positioned correctly? Is there significant amount of emergency notification boxes? Are car patrols more frequent? PTC implementation?</td>
</tr>
</tbody>
</table>
## 2019 Regional Plan Proposed Performance Measures

Do the following items help evaluate the Innovate Mobility and Planning goal?

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Not Sure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduced travel times</td>
<td>78.50%</td>
<td>11.40%</td>
<td>10.10%</td>
<td>307</td>
</tr>
<tr>
<td>2. More people walking, biking, using transit, and sharing rides</td>
<td>75.48%</td>
<td>15.81%</td>
<td>8.71%</td>
<td>310</td>
</tr>
<tr>
<td>3. A safer transportation system</td>
<td>74.35%</td>
<td>11.04%</td>
<td>14.61%</td>
<td>308</td>
</tr>
</tbody>
</table>

### Chart

![Chart showing the percentage of responses for each item](chart.png)

- **Yes** in blue
- **No** in yellow
- **Not Sure** in red

---

30
### 2019 Regional Plan Proposed Performance Measures

**Do the following items help evaluate the Vibrant Economy goal?**

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Not Sure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Adequately maintaining the current transportation system</td>
<td>69.26%</td>
<td>12.94%</td>
<td>17.80%</td>
<td>309</td>
</tr>
<tr>
<td>5. Transportation investments helping to improve the regional economy</td>
<td>82.47%</td>
<td>5.19%</td>
<td>12.34%</td>
<td>308</td>
</tr>
</tbody>
</table>

![Bar chart showing the percentage of responses for each item.](chart.png)
2019 Regional Plan Proposed Performance Measures

Do the following items help evaluate the Healthy Environment and Communities goal?

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Not Sure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Similar changes in transportation costs for all communities</td>
<td>40.33%</td>
<td>27.87%</td>
<td>31.80%</td>
<td>97</td>
</tr>
<tr>
<td>7. Transportation network support of smart growth</td>
<td>73.14%</td>
<td>10.68%</td>
<td>16.18%</td>
<td>50</td>
</tr>
<tr>
<td>8. Improved access to jobs and key destinations for all communities</td>
<td>83.28%</td>
<td>4.92%</td>
<td>11.80%</td>
<td>36</td>
</tr>
<tr>
<td>9. Improved regional air quality</td>
<td>80.65%</td>
<td>8.39%</td>
<td>10.97%</td>
<td>34</td>
</tr>
<tr>
<td>10. Reduced greenhouse gas emission</td>
<td>77.78%</td>
<td>10.46%</td>
<td>11.76%</td>
<td>36</td>
</tr>
</tbody>
</table>
### Q1: If there are other key areas that you think should be considered, please use the space below to provide your input.

<table>
<thead>
<tr>
<th>#</th>
<th>Online Survey - Comment Prompt 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SANDAG CBO Community Outreach Submittal from Alliance for Regional Solutions Performance Measures 12/12/2017 These comments are based on the information and discussion provided to CBO representatives on Performance Measures and shared at the Dec. 4 public workshop. Suggest add to or amend the list of draft/proposed performance measures: Under Innovative Mobility and Planning, add route and service frequency for all modes of public transit. This relates to key questions 1 and 2. Frequency is currently referenced indirectly under draft measure 7A (without defining “high frequency” or the modes this refers to), but needs to be measured universally for all public transit services/modes. Frequency here means how often a service/route is available to a rider, e.g. every 15 minutes, 20 minutes, etc. Draft measure 1B, suggest measure not just “peak-hour” but off-peak as well (since many work schedules today are “off-peak”, and to measure non-work related trips, medical, commercial, etc.). And measure total hours of excessive delay, not just per capita. Draft measures 7A and 7B, measure not only “high frequency” transit stops, but for all transit stops and stations; and measure within 0.25 miles, rather than within 0.5 miles (a quarter mile distance being a widely accepted measure of accessibility). And note additional “global” comment below re: how distances are measured in assessing tools/computer models. Draft measure 8A – Why 30 minutes, why not the 15 min. measure in 8B? Better, please measure and disclose percentages for several time distances, e.g. 5, 10, 15, etc. And as others commented, please measure for K-12 education as well as higher education. More global comments, relevant to performance measures and other information provided at the Dec. 4 workshop: Up to this new RTP round, my understanding is that the SANDAG Ridership model has not measured many of the things that actually drive ridership, notably, on a different network system. While it’s good to have performance measures, it is also necessary to understand how these measures themselves will be measured. Please add a column to the right of “Proposed 2019 Regional Plan Performance Measures” for disclosure of how each performance measure will be assessed; whether by computer model (and which one), or by other means (and which).</td>
</tr>
<tr>
<td>2</td>
<td>Related to travel times, frequency, and real-world access: In measuring distances and times, use door-to-door travel times, to or from select points throughout the region, rather from TAZ centroids. Using the “artificial” centroid of a TAZ can throw off measures of actual distances and times. Use actual walking distance to true rapid transit; residences and jobs within a real quarter mile walk, not a simplified quarter mile radius. Finally, at the Dec. 4 workshop it was described how a set of “unconstrained network projects” have already been adopted by the SANDAG Board. I believe I heard that this closed set of projects are to be the only set of projects which will be reshuffled and reprioritized to make up the different transit system design scenarios to be defined this Spring. This would appear to functionally exclude from consideration any alternative network design, and different projects in alternative designs. This is obviously an important point to be clear on. At the workshop I asked two different SANDAG staff if different projects can be submitted and included in this process at this time. I was encouraged to submit projects, if I knew of any. Referenced by this submittal, one or more said projects will be submitted to the SANDAG staff I have spoken with, and will be posted in the CBO Workspace set up for CBO work.</td>
</tr>
<tr>
<td>3</td>
<td>Level Of Service (LOS) measures should not be abandoned, regardless of additional analysis of Vehicle Miles Traveled (VMT). “Per-Capita” measures of pollutants/emissions are irrelevant. They imply that today’s total emissions are an acceptable baseline. “Total Emissions” is the only meaningful measure of pollutants. Can this region absorb the projected population growth without doing harm to the environment?</td>
</tr>
<tr>
<td>4</td>
<td>More bike paths and safety measures to protect bicyclists from motorists. Making signal lights bicycle-friendly. Providing low-cost or no-cost helmet cameras for bicyclists. Tax right-offs for bicycle commuters. Creating an easy to use app that allows bicyclists to photograph and report dangerous road hazards.</td>
</tr>
<tr>
<td>5</td>
<td>Measure total travel time for a transit trip, not just the speed of a bus from point to point. Include time needed for extra walking when eliminating bus stops, waits for transfer buses (better coordinate buses at transit hubs at night and on weekends so all leave at the same time) when truncating routes, what key community destinations are not served by route streamlines. Also measure how many bus stops are at safe crosswalks—put crosswalks at bus stops or move bus stops to cross walks. Take an inventory of all types of key community destinations and how many are served by transit within a quarter of a mile of their entrances. Measure the equity of transit headways across the region so some people aren’t waiting half an hour for a bus at a stop while they see other buses on a 10 minute headway pass by one after the other. Measure how many people are at isolated at home and how often and how many people are unable to access services because of inadequate transit services.</td>
</tr>
<tr>
<td>6</td>
<td>Transit trip times</td>
</tr>
<tr>
<td>7</td>
<td>Reduction of individual vehicular usage on a per capita basis.</td>
</tr>
<tr>
<td>8</td>
<td>Quality of Life - Transit time and access from work-home-parks-major events.</td>
</tr>
<tr>
<td>9</td>
<td>Consideration for efficient goods movement in all areas of the transportation plan.</td>
</tr>
<tr>
<td>10</td>
<td>Equal dollars spent on four modes: walk, bike, transit, single occupancy vehicles (SOV).</td>
</tr>
<tr>
<td>11</td>
<td>Shouldn’t “safer” be part of “healthy environment”? And “innovate” means to make changes through new methods; what are the “new” ideas, or at least a mention of taking new approaches to solving old problems? “more people walking, etc.” is rather abstract, but okay, keep it as a measure. I think, though, that there needs to be some focus on coming up with new ideas and a measure that evaluates that.</td>
</tr>
<tr>
<td>12</td>
<td>Instead of “similar” changes in transportation costs for all communities, I would suggest evaluating relative changes in transportation costs for all communities- meaning that transportation cost varies for communities of low-income and high need.</td>
</tr>
<tr>
<td>13</td>
<td>Some review of emerging auto-driven vehicles. The vast majority of San Diegans can’t bike or bus to work or school. Maximizing new technologies for our roads and highways is a vital element in all of the above.</td>
</tr>
<tr>
<td>14</td>
<td>Reduction in Vehicle Miles Traveled (VMT), not just improved commute times.</td>
</tr>
<tr>
<td>15</td>
<td>Identification of coastal shoreline/lagoons sea level rise impacts using wildlife habitat vulnerability assessments for improvements to the current transportation system. Such as managed retreat and living shorelines that maintain habitats and human uses while protecting transportation infrastructure.</td>
</tr>
<tr>
<td>16</td>
<td>Access to food.</td>
</tr>
<tr>
<td>17</td>
<td>The extent that the transportation system will provide an economic, temporal, and quality of life incentive for people to adopt smart growth residences, work places, goods, and services.</td>
</tr>
<tr>
<td>18</td>
<td>5. The percent of miles traveled does not relate to improvement in economy. 7. Placing high density housing near transit stops does not encourage people to use transit. Need more information on why/why not people use the system.</td>
</tr>
<tr>
<td>19</td>
<td>1. Health Benefits with a mobility system that promotes active transportation. Measuring reductions in traffic-related death and injuries, reductions in obesity, diabetes and other disease attributed to reduced physical activity. 2. Increased use of transit/biking/walking. 3. Transit investments drives changes in land use.</td>
</tr>
</tbody>
</table>
### Online Survey - Comment Prompt 1

<table>
<thead>
<tr>
<th>#</th>
<th>Q1: If there are other key areas that you think should be considered, please use the space below to provide your input.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Using vehicle miles traveled (VMT) as the standard.</td>
</tr>
<tr>
<td>21</td>
<td>Reduce vehicle miles traveled (VMT).</td>
</tr>
<tr>
<td>22</td>
<td>Meeting state green house gas (GHG) reduction targets and city/county Climate Action Plan targets. Reducing vehicle miles traveled (VMT). Shift significantly to transit (including percent funding spent on transit, shifting transit development forward in the schedule). Cost effectiveness of transportation modes. Health benefits (including reduced air pollution, health benefits of walking/biking, fewer accidents, etc.). A deep look into bringing accessibility to jobs, schools, services without a car.</td>
</tr>
<tr>
<td>23</td>
<td>Being culturally sensitive to avoid language barriers when users communicate with driver using city buses.</td>
</tr>
<tr>
<td>24</td>
<td>Healthy Environment &amp; Communities should also reduce Vehicle Miles Traveled (VMT). And social equity should be a factor in all areas. Cost of transportation, safety, economic opportunity all vary depending on the community. SANDAG should strive to make the greatest improvements in the areas that are at the greatest disadvantage.</td>
</tr>
<tr>
<td>25</td>
<td>At the public meeting, I brought up measuring the quantity of people walking/biking to locations within 5 miles (or other various distances) of their home in different communities. I was shown to the &quot;20 mins of physical activity in regards to transportation&quot; metric, but I realize now why I think that the percent doing so within a certain radius of their home is also important. Mainly, a low percentage for the 20 mins, while an important metric, paints an incomplete picture - do people not feel safe, or is there nothing close-by? The distance metric would help resolve that question.</td>
</tr>
<tr>
<td>26</td>
<td>Number of jobs accessible by public transit within 30 minutes by TAZ</td>
</tr>
<tr>
<td>27</td>
<td>Vehicle miles traveled (auto), hours of delay,</td>
</tr>
<tr>
<td>28</td>
<td>Travel time reductions should not be a metric if that means investments will focus on increasing auto throughout and speed. Rather the focus should be on moving people and stoking transit-oriented development that improved access to jobs, housing, and services.</td>
</tr>
<tr>
<td>29</td>
<td>Cost</td>
</tr>
<tr>
<td>30</td>
<td>Innovate Mobility and Planning should include alternatives for handicapped, seniors and mobility challenged.</td>
</tr>
<tr>
<td>31</td>
<td>Calculate the amounts of gasoline and diesel fuel used per vehicle registered in the state and in the county for each kind of vehicle. Do the same with heating fuels. When those fall, we can begin to think we're making progress.</td>
</tr>
<tr>
<td>32</td>
<td>Measure how much fossil fuel is used year by year to see whether it's declining.</td>
</tr>
<tr>
<td>33</td>
<td>Reduce VMT</td>
</tr>
<tr>
<td>34</td>
<td>Resiliency of the transportation network for the climate chaos associated with Wild Fires, Earthquakes, Tsunamis, Tropical Storms, etc. and the upcoming Global Climate changes from Global warming.</td>
</tr>
<tr>
<td>35</td>
<td>Key innovations not mentioned in the SANDAG Summary from 12/4/2017. SANDAG should plan for, rather than let happen: the impact of increased drone use; high speed rail line from San Diego-Tijuana; Transit connection to Cross Border Xpress to Tijuana airport; Driverless car regulation and implementation, etc.</td>
</tr>
<tr>
<td>36</td>
<td>Carpool should be separate from walk, bike and transit use. Air quality measures should be at local not regional level</td>
</tr>
<tr>
<td>37</td>
<td>People want to get from Point A to Point B efficiently, without a transfer of modes. When SANDAG learns that we will move forward.</td>
</tr>
<tr>
<td>38</td>
<td>Increase public transit access throughout San Diego County so that every community is served and connected to every other community. Investment in public transport systems that serve the last mile neighborhoods to home and work. Collaborate and coordinate with developers to produce activated, diverse, transit centric districts focused on a &quot;Main Street&quot; approach to more and compact TOD. Diligently support and incentivize the inclusion of Permanent Supportive Housing development at every major modal transportation site throughout the County.</td>
</tr>
<tr>
<td>39</td>
<td>The cost of supporting electric vehicles should be included. Support of Gas Tax increase. Moonbeams Train to nowhere.</td>
</tr>
<tr>
<td>40</td>
<td>Please, better bike infrastructure and other public transit like busses and trolleys!</td>
</tr>
<tr>
<td>41</td>
<td>Travel time consistency with growth. Road pricing based on demand would help accomplish this.</td>
</tr>
<tr>
<td>42</td>
<td>This regional plan vision is all over the place and needs focus. My question is, why is San Diego moving so painfully slowly in building out a reasonable mass transit system? Just look at Los Angeles—they have vision. This plan here is not in my opinion. I understand they passed Measure M (and R before that), but somehow their transit officials have vision and clarity. This proposal here is very lacking, should be scrapped and started over.</td>
</tr>
<tr>
<td>43</td>
<td>Planning for more bike options should distinguish between those that use bikes for recreation and those that use bikes as alternate transportation. I don't believe they are the same in terms of reducing auto dependency. More emphasis, in my opinion, should be placed on creating both bike-friendly and pedestrian-friendly short connections within neighborhoods with connections to retail and other services that one might opt for an alternate to driving if there was a pleasant alternative. In my opinion, while recreational biking may promote a healthy lifestyle, which is a good thing, it should not be assumed to reduce auto dependency in the same manner that reducing the need for shorter, more local trips would be able to accomplish. Smart planning, even within projects, that account for a pleasant journey by bike or on foot might encourage families and individuals to take a walk or ride a bike for quick errands, instead of driving the short distance for neighborhood services. With that in mind, key areas to consider would be the quality of the bike and pedestrian experience both within projects and communities as a whole.</td>
</tr>
<tr>
<td>44</td>
<td>One vision statement is provided followed by questions about four different goal topics. What are each of these goals? How are people expected to know performance measures for an abstract idea that is not defined?</td>
</tr>
</tbody>
</table>
### Online Survey - Comment Prompt 1

**Q1: If there are other key areas that you think should be considered, please use the space below to provide your input.**

<table>
<thead>
<tr>
<th>#</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>Reducing trip times is only good for transit not driving so your question above is ill-formed. Walkability/connectivity is a key aspect of whether or not transit stations will be well-used. A transit-friendly environment requires walking connectivity and especially in the era of online maps. Sidewalks with setbacks from busy streets and bridges allowing escape from car-dominated locations. The planned trolley stations are not being designed with adequate connections into the areas around them.</td>
</tr>
<tr>
<td>46</td>
<td>I think walking/biking should also be part of “Healthy Environment and Communities”.</td>
</tr>
<tr>
<td>47</td>
<td>Well rounded plan including more highway lane miles/express lanes coupled with transit and active transportation. One alone does not solve the problem.</td>
</tr>
<tr>
<td>48</td>
<td>In areas where mass transit does not make sense, due to low density, it is important that road improvements take priority.</td>
</tr>
<tr>
<td>49</td>
<td>Prioritize projects by initial positive impact. I.e. consider first projects by ridership, environment impact and economic contribution.</td>
</tr>
<tr>
<td>50</td>
<td>Please prioritize the expansion of public transit and pedestrian-friendly, mixed-use neighborhoods throughout San Diego County.</td>
</tr>
<tr>
<td>51</td>
<td>Public transit and active modes (biking, walking, etc.) are crucial to improving transportation overall, building social equity, job opportunities, public health, and reducing environmental damage. Private automobile use is unsustainable, unhealthy, unaffordable, and unsafe.</td>
</tr>
<tr>
<td>52</td>
<td>More emphasis on automobile travel, not public transportation</td>
</tr>
<tr>
<td>53</td>
<td>Traffic congestion and improving traffic flow should be your top priorities. This affects all the other aspects of peoples lives.</td>
</tr>
<tr>
<td>54</td>
<td>Much improved regional public transit - let's speed double tracking coast - link Coaster with trolley - increase high density housing.</td>
</tr>
<tr>
<td>55</td>
<td>Moving cars on freeways should be SANDAG’s number 1 priority.</td>
</tr>
<tr>
<td>56</td>
<td>1.) Start building double (triple decker freeways. 2.) If you yourselves are not going to give up your cars, do not ask the general public to give up theirs, either. 3.) Try to connect state route 56 to state route 76, between Interstate 5 and Interstate 15. 4.) Instead of having to wait at a five minute traffic light, use more round - abouts. 5.) Use “flashing” green lights to warn drivers of an impending amber traffic light. (Less auto accidents, and guessing.) 6.) Incorporate Uber - type transportation as part of the solution. You buy, maintain, fuel and staff the vehicle using a pay system similar to the “compass” system. 7.) Housing centers, train for employment, and feed the homeless.</td>
</tr>
<tr>
<td>57</td>
<td>San Diego County is the largest refugee resettlement site in the State of California. While trying to make sense of their new home and start life from scratch, refugees have to attend classes, job training, job search and cater for their families. The current transportation fare is not affordable for many families; it puts financial hardship and affliction on those who are barely starting life in the San Diego region. I suggest giving a priority to newcomers to have 75% reduced bus fare to elevate financial hardship and encourages newcomers to become active in attending classes, job training, and job search to help them overcome barriers to social and economic self-reliance and thrive.</td>
</tr>
<tr>
<td>58</td>
<td>On-time, frequent stops, conveniently located stops, and user friendly.</td>
</tr>
<tr>
<td>59</td>
<td>Yes, we need a transit-first, ADA-friendly, active-transportation filled Regional Transportation Plan for 2019</td>
</tr>
<tr>
<td>60</td>
<td>Connecting the trolley to the Airport seems to be key to these goals. This is the face of the City and embarrassing telling friends to take a shuttle to a car or other transportation hub.</td>
</tr>
<tr>
<td>61</td>
<td>Have more safe and walkable sidewalks and make bus shelters more welcoming.</td>
</tr>
<tr>
<td>62</td>
<td>Hope you look at University City next year. We have had little to no bike access to UCSD from the south east comrer of campus where most people live.</td>
</tr>
<tr>
<td>63</td>
<td>If you're taking the pedestrian &amp; cycling communities seriously then you'll have better air to breath &amp; a healthier community. Will this be taken seriously? Then use buses with clean fuel or electrically run.</td>
</tr>
<tr>
<td>64</td>
<td>We could really use a direct/express transport option between uptown (Kensington through Mission Hills to Sorrento Valley) to alleviate traffic on the I805. Current options with connections take too long to be competitive with driving.</td>
</tr>
<tr>
<td>65</td>
<td>Quicker light rail lines.</td>
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<tr>
<td>66</td>
<td>Expand the network to rural areas.</td>
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<tr>
<td>67</td>
<td>Evaluate a shift of public tax dollar funded activity to the private sector in order to reduce the administrative burden.</td>
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<tr>
<td>68</td>
<td>Reduced fees if the fee revenue is not used to meet the intended goal.</td>
</tr>
<tr>
<td>69</td>
<td>This survey looks at big goals, not the daily frustrations that prevent people from using alternative transportation to get to work. I would suggest that you add an e-interface for the public, so people can check if buses and trolleys and trains are on time. Uber and Lyft can do this, why not Sandbag. I also would address the user experience on many levels: 1) kiosks - most are difficult to use and don't work correctly; 2) interiors of vehicles, including sound systems -- what would make people more comfortable, more efficient, and able to understand the announcements; 3) what routes and hours can be changed to accommodate the local riders better? 4) what routes and hours can be added to accommodate the locals AND the tourists? It is a crime that #923 doesn't offer weekend rides -- there's no better way to see our beautiful harbor. I feel like your stated goals above are so &quot;governmental, bureaucratic, and general&quot; and don't begin to address the reasons people will not take public transportation. Start your goals from the bottom up -- figure out what the riders, and the potential riders want. Then set the goals.</td>
</tr>
<tr>
<td>70</td>
<td>Light Rail in North County to UTC area and Downtown</td>
</tr>
</tbody>
</table>
Q1: If there are other key areas that you think should be considered, please use the space below to provide your input.

71 The public transportation system in San Diego County is inadequate. There are not enough trolley lines and trolleys should be underground or above ground on bridges to avoid car traffic downtown. This will boost ridership.

72 Transist is a joke in North County….takes hours to get anywhere. Also must consider the coastline and views!!!!

73 Expand the number of lanes on major freeways, or increase HOV lanes.

74 More focus on bike friendly cities and safe commuting routes. I commute by bike from Solana Beach to downtown San Diego and it is very dangerous plus roads/bike paths are not properly maintained.

75 Presently Surfliner trains overnight at Santa Fe Depot, creating severe noise and pollution for thousands of downtown SD residents. A new layover facility is urgently needed, away from the growing city core. This new facility has been mandated by the City since 1983 and planned by CalTrans since 2001; it must be delivered!

76 Please extend trolley times to 3am to allow hotel workers to ride after shifts and night owls to use trolley instead of driving drunk.

77 The routing of MTS buses in the UTC, University City, Bay Ho, Alcott communities needs better coordination. Can we have a bus that loops Genesee Avenue to La Jolla Village Drive to North Torrey Pines Road to Genesee Avenue again?

78 More, faster, double tracking, no kidding!

79 Elimination of favoritism to the automobile by requiring merchants, landlords, employers, and schools to give transit users an equivalent benefit to the free parking offered auto users.

80 Develop more pedestrian and multiuse trails and pathways to connect communities to regional trails, parks and open space.

81 More train lines (like Coaster, Trolley) from Downtown to inland North County. More people will use public transportation if more lines are constructed. Like Berlin, New York, Santiago, any metropolitan city that has reliable public transit.

82 It was a huge help when the commuter lane was put on highway 15, what about 56, it is a problem for two reasons. Traffic backs up on 56 which causes a backup on 15. Consider a long term plan to double deck some of the freeways, I know what happened in San Francisco, I was there, not on this section, but something must have changed to make safer levels and we don’t have the Earth quake problems San Francisco has. Also extend the commuter lane further north, it is a nightmare to get on 78, which is also a problem. I know that the state has passed State law 1069 allowing for infill for more housing, well, where are these people going to drive. Our roads start backing up before 4pm, and the bus is not the answer.

83 Trains in San Diego are half empty and they blow sob wherever. Trains here do not stop at major destinations like the airport, shopping centers, and Universities. Places with huge parking lots have many people wanting to go there.

84 Better public transportation to the airport and major tourist attractions. Why does the trolley not go to the airport? Why does the trolley not go to the beach?

85 There needs to be a bigger emphasis on making public transportation desirable as opposed to just being an option. Bus routes and trolleys should be prioritized over passenger vehicles when it comes to major city events such as December Nights. The city could have done better with respect to making it make sense to take public transportation from the city’s neighborhoods to the event. Unfortunately, they forced people who wanted to take bus routes that would normally stop right at Balboa to go all the way downtown. Then to take another shuttle right back up to practically where they started from or else walk two miles from University and Park Avenue down to the event. This doesn’t make any sense if you want to promote public transit. It should be a focus of the RTA and the City of San Diego to plan these events in a way that people would prefer and want to take the buses to the event as opposed to a half a million people being encouraged to drive to the event. This is just an example of why public transit appears to be an afterthought in this city when it could really be a boost to the city, the surrounding neighborhoods, and the county as a whole if promoted and expanded correctly. So better event planning and strategic expansion should be a focus on all fronts.

86 You should consider changing ineffective High Occupancy Vehicle (HOV) lanes to all use to benefit more tax payers. Specifically the Carroll Canyon parts.

87 We really need transportation to coordinate on land-use in order encourage more mixed-use development and housing. Inter-connectivity for North County and the City of San Diego would be key, I would suggest.

88 Improved bikeability. We have perfect weather for it, but the infrastructure is woefully inadequate and dangerous.

89 Making sure the resources are being given equally. Far more investment has been done for North County and golden triangle while East County has not changed including the 94 and 125 interchange. The 125 has daily gridlock, and 52 rush hour gridlock.

90 Earlier bus routes going downtown from Sabre Springs.

91 I'm retired and biking is not an option for me for doctor appointments and grocery shopping. Fix mass transit (which I have been waiting for 40 years for logical improvements) instead of more blacktop which makes everything hotter. Try to get past your lack of innovation to real solutions.

92 Are you trying to gain bond support with these questions? San Diego won't support more waste

93 This questionnaire is asked in such a biased way that I decided to leave it blank. I hope you do not do it to prove any talking points in the future.

94 Get someone to write questions that are not obfuscation for your own agenda.

95 The bus system should be expanded for East to coastal West routes, i.e. to La Jolla. It should take only 45 min -1 hour to get to uptown/mid-city to La Jolla on the bus during the week.
Q1: If there are other key areas that you think should be considered, please use the space below to provide your input.

96 Bus routes from East to coastal West areas need to be expanded (i.e. from North Park to La Jolla). Currently takes 2 hours. Travel time should be reduced to 45 minutes - 1 hour.

97 Highway 125 at eastbound 94 is a nightmare and like riding a roller coaster. Shame on Caltrans. Please correct this road and make sure it doesn’t happen again.

98 Low density housing is part of a quality of life issue for people. Living on top of one another in the high density housing San Diego keeps trying to foist on us leads to stress, depression, road rage, mass shootings, etc. Stop with the transit oriented development of high density housing.

99 Light-duty vehicles (LDVs) emit the most GHG. Therefore, every MPO, including SANDAG should minimize VMT. Note that the State has the primary responsibility of improving fleet efficiency, MPOs responsibility is in reducing VMT.

100 Add 21st century technologies to street lights so we aren’t stopped at lights for no reason.

101 Build a trolley line along I-15 corridor from Mission Valley to Rancho Bernardo / Poway to alleviate traffic congestion there.

102 Real cities have real public transportation systems that work and are on time. San Diego is deficient in this regard. Also, security is lacking the level of real cities like L.A. and San Francisco and Portland, OR. Light rail, subways are the way to go in the long run. Untaxed San Diego must ante up and concentrate up to achieve the goals of the 21st Century. We are already years behind the pollution, homeless, and housing curve. We are a joke.

103 I think the HOV lanes do little to nothing to help our transportation. I think we should assess how many actual vehicles are removed by HOV lanes. I believe the result will be miniscule.

104 Bike paths are rarely used and increase auto travel times and pollution. Rail is also underused and diverts excess funds from roads.

105 Offer free public transit to Medicare recipients. It will get a bunch of old people off the street, and keep those seniors with extremely limited incomes from being isolated because they cannot even afford an $18 a month pass.

106 Guaranteed free, or very, very inexpensive transit for homeless, senior, handicapped, and veterans so that they can be involved in community as minorities! With very easy access to getting tickets 24 hours a day, 7 days a week, with more and better bathrooms and shopping opportunities. Why should transit users, especially these riders in particular, have to make separate, extra trips, when the last mile is so critical to using transit.

107 Recommend a trolley from San Diego Airport, through Hillcrest, between San Diego Zoo and Balboa Park to Navy San Diego Medical Center.

108 Take off the toll for the 125.

109 This whole project is a mess…an huge imposition on us who live in the area and…this is California…no one really wants/uses public transportation in the first place

110 Promover intercambio de trabajos iguales o similares dependiendo del area donde vivimos para reducir el millaje de los vehiculos y la polucion. Promote equal or similar job sharing opportunities based upon the area where we live to reduce vehicle mileage and pollution.

111 El precio del autobus esta muy alto, demasiado alto para City Heights, una comunidad de bajos recursos. Bajan los precios por favor. The bus fares are very high, too high for City Heights, a low-income community. Please lower bus fares.

112 It was a wonderful workshop. I don’t speak Spanish but I am trying to make sense out of the questionnaire.
Online Survey - Comment Prompt 2

Q2: Please use the space below to comment on the Proposed 2019 Regional Plan Performance Measures.

1. Rail freight needs to be considered as well as our marine terminals for ocean freight.

2. The travel times and VMT comparisons are good. Rail freight needs to be considered as well as our marine terminals for ocean freight.

3. The metrics previously listed are so broad they almost have no meaning. Please be specific in the performance measures as it relates to a vision of our region.

4. The metrics previously listed are so broad they almost have no meaning. Please be specific in the performance measures as it relates to a vision of our region.

5. Some hard numbers rather than percentages: -Total number of bicycle miles pedaled by commuters. -Number of automobile miles not driven because would-be drivers use bicycles. -Number of automobile miles not driven because would-be drivers use public transit. -Physical count of commuters using bicycles & public transit. If "major transit stops" enable transit housing density bonuses, then we must assure that transit equipment actually services those locations frequently. MTS changes its schedules to suit budgetary and other goals, but once added, that housing density will always remain. So designation of a transit bonus zone must be a permanent commitment. How to measure the good faith performance of the transit agency? Perhaps a positive measure: "Average frequency of commute-time service at TOD-designated transit stops." Obviously I'm expecting the agency to struggle with compliance, so we need a measure that will challenge them to try harder. How about: "Percentage of commute hour opportunities at designated transit stops with actual service frequency of 15 minutes or less." What performance measures were used for the previous regional plan? Were any abandoned? Suggest some continuity to trace historical versus future progress. Also, repeating from previous page, Level Of Service measures should not be abandoned, regardless of additional analysis of Vehicle Miles Traveled. "Per-Capita" measures of pollutants/emissions are irrelevant. They imply that today's total emissions are an acceptable baseline. "Total Emissions" is the only meaningful measure of pollutants. Can this region absorb the projected population growth without doing harm to the environment?

6. I think it is important to include a measure related to healthy food access in the Regional Plan. Measures could include: average distance to retail stores with fruits and vegetables, or percent healthy food retail stores within X distance from public transit, etc.

7. Introduce a qualitative metric for the transportation side of the plan as opposed to focusing completely on efficiency. It seems quality is only mentioned when speaking of the environment.

8. The metrics previously listed are so broad they almost have no meaning. Please be specific in the performance measures as it relates to a vision of our region.

9. Please use Vehicle Miles Traveled as the basic measurement. Assess youth VMT and Youth Active transit miles travelled. Overall VMT reduction to match Caltrans target of 3% a year and to exceed CARB targets for 2025, 2035 and 2050. Mode shift to transit, as required by AB805 Compliance with Climate Action Plans on mode share targets. Meet or exceed VMT reduction goals for 2025, 2035 and 2050. Regarding the percent of income spent on transportation (equity measure), change the guiding question of relative costs of transportation (Question #5) from "changing similarly" to "changing equitably." Additionally measure the percent of family income spent on transportation per family member. Overall cost effectiveness of transportation by mode share - cost per mile traveled - What is the cost per mile traveled when in terms of public funds (overall cost of building, maintaining roads, law enforcement, accidents etc.) and to the user (purchase of car, parking space, bike, shoes, insurance, maintenance, depreciation etc., AAA and Edmonds.com can help provide this information for users). This is important if we want to reduce the overall cost of transportation and show one of the benefits of mode share shift.

10. 1. "Percent of non-single occupant vehicle (SOV) travel (work-trips and all trips)* is inadequate to measure mode share. SANDAG should look at public transit and bike ridership, which are already measured by MTS and the regional bike counters, respectively. 2. "Is the current transportation system being maintained?" fails to take into account that future investments require more maintenance. Average cost of maintaining a transportation investment (i.e. freeway vs. bike lane) should be factored into performance measure. 3. "Do the transportation investments help to improve the regional economy?" fails to take into account social equity. Areas with less access to jobs and less access to cars should be prioritized for improvements. This is true for "Are the relative costs of transportation changing similarly for all communities?" It is more expensive for some communities (rural/suburban) to maintain infrastructure than others because of miles of road needed to connect them. 4. "Percentage of population/employment within 0.25 miles of a bike facility (class I and II, cycletrack, and bike boulevard)" fails to take into account whether said bike facility provides a connection to employment. A half-mile of bike lane on a random street that is not connected to a network is useless. 5. "Is access to jobs and key destinations improving for all communities?" again fails to take equity into account. Some communities should have to accept deferred improvements to ensure a more equitable society.

11. I brought up measuring the quantity of people walking/biking to locations within 5 miles (or various other distances) of their home in different communities. I was shown to the "20 mins of physical activity in regards to transportation" metric, but I realize now why I think that the percent doing so within a certain radius of their home is also important. Mainly, a low percentage for the 20 mins, while an important metric, paints an incomplete picture - do people not feel safe, or is there nothing close by? The distance metric would help resolve that question.

12. Number of housing (low, market, high) built within half mile of high frequency transit system

13. Environmental impact should include effects on water quality and land use (% of public space claimed by roads and parking, that could be used for community spaces, housing, schools, and other social needs). The criteria places too much emphasis on travel time, which gives the dominance of private autos means increasing driving speeds, which are hazardous, stressful, and antisocial. Noise needs to be included as a criterion for local roads as well as highways. I live a half mile from I-5 and the noise level is insane; we cannot use our back yard, and the racetrack effect begins daily at 5:30am. It interferes with my sleep and causes distress all day and evening. Traffic to and from the nearby schools is also loud, stressful, and dangerously fast, far above the supposed 25mph limit. I estimate people typically drive 35 mph and even 45 on our short residential stretch. Bring back the school buses. Traffic calming is another needed criterion.

14. Average travel times are a sound and simple measure of performance, but I think other criteria, like number of transfers, amount of time used for helping disabled riders, increased availability of alternative routes, more penetration into residential areas would also be useful information.
Online Survey - Comment Prompt 2

<table>
<thead>
<tr>
<th>Q2: Please use the space below to comment on the Proposed 2019 Regional Plan Performance Measures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. There must be a measure of connectedness/walkability between the stations and planned nearby increases in density and the closest major “destinations” such as beaches or theaters etc. with respect to the locations for transit stations. A successful and safe transit environment requires a safe walking environment. Right now, stations are being pushed into locations without adequate connections. Possible measures of this are: sidewalks with setbacks from busy streets vs either no sidewalks or sidewalks without setbacks (most current conditions in car dominated areas in the cities here). Bridges over car-dominated areas that cannot be otherwise made walkable. The importance of this cannot be emphasized enough. Getting people out of cars requires a pedestrian-friendly-designed environment around transit stations. Everyone who uses transit is a pedestrian - even if they drive to a parking lot next to a station. We are not making these connections and it is a key mission component of so-called “smart growth.”</td>
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<tr>
<td>16. Under the “Healthy Environment and Communities” goal, there doesn’t seem to be a performance measure for the actual health of a community. Are the measures referring to people/community’s health as a function of the environment/air quality etc.? I am just curious to see if there will be a physical/mental health component factored into the decisions made around transportation. Will people’s reported satisfaction, happiness, mental, and/or physical health factor into the measures somewhere?</td>
</tr>
<tr>
<td>17. Moving cars and reduction of traffic gridlock should be a performance metric.</td>
</tr>
<tr>
<td>18. For the question “Are travel times reduced?” I would suggest also considering weekend travel times on public transit to leisure destinations (Mission bay, beaches, Balboa park, etc.)</td>
</tr>
<tr>
<td>19. Given the severity of our climate crisis, the only performance measure that makes sense is the reduction of VMT.</td>
</tr>
<tr>
<td>20. Measures that determine the effectiveness of the various transportation options.</td>
</tr>
<tr>
<td>21. The most important performance measure is “Reduced Travel Time” and should outweigh all other performance measures combined. It needs to be the #1 goal.</td>
</tr>
<tr>
<td>22. Travel times should include from homes/residences to major freeways and public transportation hubs.</td>
</tr>
<tr>
<td>23. “Average travel time” to work is an important metric that impacts the regions economic output, air quality and housing issues. Driving that time number down will raise people’s satisfaction and feeling of well being.</td>
</tr>
<tr>
<td>24. Separate carpool from transit and active commute modes. Measure all modes, not just SOV trips. Identify how they will be measured. Key Question (KQ) 4. The question is whether the system meets needs, not whether we’re maintaining a system that is not effective. KQ 7. Measure percent of population within quarter miles of ALL facility types, not lumped together. Include measure of commute enjoyment and satisfaction. Set minimum standard for air quality by city, not for the region.</td>
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</table>

SANDAG CBO Community Outreach Submittal from Alliance for Regional Solutions Performance Measures 12/12/2017: These comments are based on the information and discussion provided to CBO representatives on Performance Measures and shared at the Dec. 4 public workshop. Suggest add to or amend the list of draft/proposed performance measures: Under Innovative Mobility and Planning, add route and service frequency for all modes of public transit. This relates to key questions 1 and 2. Frequency is currently referenced indirectly under draft measure 7A (without defining “high frequency” or the modes this refers to), but needs to be measured universally for all public transit services/modes. Frequency here means how often a service/route is available to a rider, e.g. every 15 minutes, 20 minutes, etc. Draft measure 18, suggest measure not just “peak-hour” but off-peak as well (since many work schedules today are “off-peak”, and to measure non-work related trips, medical, commercial, etc.). And measure total hours of excessive delay, not just per capita. Draft measures 7A and 7B, measure not for only “high frequency” transit stops, but for all transit stops and stations; and measure within 0.25 miles, rather than within 0.5 miles (a quarter mile distance being a widely accepted measure of accessibility). And note additional “global” comment below re: how distances are measured in assessing tools/computer models. Draft measure 8A – Why 30 minutes, why not the 15 min. measure in 8B? Better, please measure and disclose percentages for several time distances, e.g. 5, 10, 15, etc. And as others commented, please measure for K-12 education as well as higher education. More global comments, relevant to performance measures and other information provided at the Dec. 4 workshop: Up to this new RTP round, my understanding is that the SANDAG Ridership model has not measured many of the things that actually drive ridership, notably, on a different network system. While it’s good to have performance measures, it is also necessary to understand how these measures themselves will be measured. Please add a column to the right of “Proposed 2019 Regional Plan Performance Measures” for disclosure of how each performance measure will be assessed; whether by computer model (and which one), or by other means (and which). Related to travel times, frequency, and real-world access: In measuring distances and times, use door-to-door travel times, to or from select points throughout the region, rather from TAZ centroids. Using the “artificial” centroid of a TAZ can throw off measures of actual distances and times. Use actual walking distance to true rapid transit; residences and jobs within a real quarter mile walk, not a simplified quarter mile radius. Finally, at the Dec. 4 workshop it was described how a set of “unconstrained network projects” have already been adopted by the SANDAG Board. I believe I heard that this closed set of projects are to be the only set of projects which will be reshuffled and reprioritized to make up the different transit system design scenarios to be defined this next Spring. This would appear to functionally exclude from consideration any alternative network design, and different projects in alternative designs. This is obviously an important point to be clear on. At the workshop I asked two different SANDAG staff if different projects can be submitted and included in this process at this time. I was encouraged to submit projects, if I knew of any. Referenced by this submittal, one or more said projects will be submitted to the SANDAG staff I have spoken with, and will be posted in the CBO Workspace set up for CBO work. |
| 26. 6. change similarly to equitably. 5. add reduction of congestion 5. instead of reliable change to budgeted time vs. actual time 8. Break it down into senior v. non-senior, low-income v. high income, and mode. * Transportation is going to be very different in the next few years. All seniors will be able to access info with smart phones in the next few years, millennials will use public transportation more as they age, and shared rides and driverless cars will increase access to other modes of transportation for non-drivers. |
| 27. Developing and maintaining reasonable alternatives to driving, especially single occupancy driving is paramount. We must get people out of their cars and into alternative ways of getting around that are safe, efficient, and better for the environment. |
| 28. Health metrics are good. We need to pay close attention to GHG and serving communities that are not served, or underserved. |
| 29. A key performance measure as we move forward as a region, I believe, is to evaluate whether the new Regional Plan supports Smart Growth and Planning in both infill and new areas of opportunity. |
**Online Survey - Comment Prompt 2**

<table>
<thead>
<tr>
<th>#</th>
<th>Q2: Please use the space below to comment on the Proposed 2019 Regional Plan Performance Measures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>There is no way to evaluate the performance of government’s subsidized delivery of transportation services in the measures. “How many transportation services are now wholly owned and operated by the private sector” would be a different measure to those listed under “Vibrant Economy”. The current measures are seeking to recognize the value attributable to making incremental change, rather than MEASURING government innovation. Uber and Lyft are demonstrating that public transportation can be done a different way. If you thought that $78 million a mile on a new rail project is questionable, the performance measures as they stand won’t help SANDAG course correct for these types of innovations quickly enough.</td>
</tr>
<tr>
<td>31</td>
<td>I find the proposed performance measure appropriate given the region’s goal but with one caveat: I would not support using these measures to create policies that act to make traffic worse on our roads with the unstated goal of forcing San Diegans to bus, bike, walk. I support incentives, not informal mandates as some in the transit-first camp are promoting.</td>
</tr>
<tr>
<td>32</td>
<td>The move to better facilitate walking and biking and increasing the economic growth are valid, but should not discount the ability for senior or disabled people currently living here with limited means and mobility issues.</td>
</tr>
<tr>
<td>33</td>
<td>Would like clarity on the timeline for assessing finalizing the performance measures and what exact role they will play in developing the next regional plan (e.g., want to make sure the measures are public, and how they are used in analyzing different scenarios needs to be transparent and clear, how public comments on the performance measures will be incorporated/change the PMs). Are the measures weighted? Are you collecting input on that? How will the plan be evaluated against the performance measures moving forward - have we done this before? Do we evaluate the current plan against performance measures? Ideally this would be a public, transparent process to keep us accountable and on target.</td>
</tr>
<tr>
<td>34</td>
<td>It would be useful to know the proposed method to calculate each performance measure and allow comments on those.</td>
</tr>
<tr>
<td>35</td>
<td>In reality the performance measures are fine. The problem is that SANDAG, San Diego County jurisdictions, Caltrans, and San Diegans themselves continuously ignore them in support a highway and roadway widenings. Implementation is key. Stop creating forward-thinking performance measures simply to check off a regional plan checkbox. Actually do something with them. Make them a tangible part of the decision-making process.</td>
</tr>
<tr>
<td>36</td>
<td>The performance measures must align with the land use plans provided by the cities in the county otherwise transportation is at odds with land use plans and design.</td>
</tr>
<tr>
<td>37</td>
<td>Most improvement will come from better fuel efficiency of vehicles using highways. Measure that. Also there are no measurements for the influence of UBER/Lyft/Driverless Vehicles. These will all impact how we move about. We need good, efficient highways for all of these.</td>
</tr>
<tr>
<td>38</td>
<td>Reduction of VMT is a key performance measure. I feel that reduction of travel time is at odds with environmental goals.</td>
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<tr>
<td>39</td>
<td>There should be a performance measure that addresses the “missing links” in our system. Particularly, does the change address these missing connections, or something similar.</td>
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<tr>
<td>40</td>
<td>Innovative mobility and planning never mentions planning for: Providing multiple routes to underserved areas; High speed rail line; Increased drone use; Driverless car regulation, etc. Vibrant economy never mentions planning for: A lack of east/west transit connectivity which is visible on the San Diego County Regional Transit Map; Various Transit access outlets (bike, bus, rail, international borders, etc.), connecting the Cross Border Xpress to Tijuana airport; Increased transit access, increases economic development. Healthy Environments and Communities never mentions planning for: Examining the impact of increased wild fire activity throughout the county and the possible closure scenarios on our major roads I-5, I-15, etc. Reducing one way in, one way out (Cull-de-sac) suburban planning which results in severe impact for emergency service access and resident safety. Separating carpool, truck and passenger car on major streets and thoroughfares throughout the county. (E.g. Highway I-163 becomes carpool and passenger cars only – all trucks use I-5).</td>
</tr>
<tr>
<td>41</td>
<td>ADA - accessible public transportation for all is a vital area not to forget</td>
</tr>
<tr>
<td>42</td>
<td>The proposed 2019 regional plan performance measures are not clear to my community and the questions are confusing. I don’t even know what the measures are.</td>
</tr>
<tr>
<td>43</td>
<td>Does not prioritize public transit enough</td>
</tr>
<tr>
<td>44</td>
<td>For me, there needs to be an intense focus on ability to travel/commute by bicycle and I’d like to see more performance measures specific to that goal</td>
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<tr>
<td>45</td>
<td>speeding up “drive alone” car travel times should not be a goal</td>
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<tr>
<td>46</td>
<td>Cost should be utilized to allocate funding to the benefit of the entire community and how they currently use transportation modes and what they are inclined or able to use in the future. Funding should not disproportionately be used to offset expenses or subsidize alternative modes of transportation. If it cost $20k per year to provide bike lanes for 2% of the population maybe that funding should be distributed to roadway networks to benefit more users.</td>
</tr>
<tr>
<td>47</td>
<td>To increase the food accessibility on low income or less privileged communities where fast food saturations and food desert areas are not able to obtain healthy meals or better sources of healthy food.</td>
</tr>
<tr>
<td>48</td>
<td>More focus on planning for events and strategic expansion should be the focus. People should prefer the ease and reliability of public transit over the hassle of driving. So far, my experience is, that is a challenge in this city.</td>
</tr>
<tr>
<td>49</td>
<td>Public transit efficiency and access should be prioritized in assessing performance above factors involving automobiles.</td>
</tr>
<tr>
<td>50</td>
<td>Smart growth would be to encourage employment centers in East County and South Bay to reduce the need for everyone to commute in the same direction</td>
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<tr>
<td>51</td>
<td>There needs to be specific modes split goals and better goals to support transit access-especially for disadvantaged communities. None of the measures ensure habitat preservation - this needs to be much more direct.</td>
</tr>
<tr>
<td>52</td>
<td>Keep the clean air &amp; safe pedestrian/cyclist themes high on the priority list</td>
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<td>#</td>
<td>Comment</td>
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<tr>
<td>53</td>
<td>The performance measures should quantify and lead toward greater availability of transportation options, especially bike/walk/transit access. Any measure that deals with auto delay (no longer a CEQA impact) should be replaced with travel time consistency based on future road pricing options that can respond to demand.</td>
</tr>
<tr>
<td>54</td>
<td>Deprioritize highway expansions in favor of effective transit projects</td>
</tr>
<tr>
<td>55</td>
<td>More emphasis on automobile travel, not public transportation.</td>
</tr>
<tr>
<td>56</td>
<td>Not enough weight on public transit, too much weight on cars.</td>
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<tr>
<td>57</td>
<td>While you ask many of the right questions, your answers are usually skewed to the less densely populated areas of my city. We need relief from the single-occupant cars. Public transportation (commuter rail, subway, and trolley) must supplant the fatal congestion of the present. You fail on this, you fail on the future of the San Diego region.</td>
</tr>
<tr>
<td>58</td>
<td>You should assess how many cars in HOV lanes actually take cars off the road. In other words, if a car has two or more people who would normally be in the same car that does not mean the HOV lane has removed a car.</td>
</tr>
<tr>
<td>59</td>
<td>Provide safe, friendly and low cost transportation for seniors.</td>
</tr>
<tr>
<td>60</td>
<td>Less focus on auto travel times, greater focus on reducing VMT and safer transportation system for all travel modes.</td>
</tr>
<tr>
<td>61</td>
<td>Reduced greenhouse gas emissions.</td>
</tr>
<tr>
<td>62</td>
<td>I would prefer that reduced travel time apply to all types of transportation. I sense however, that it focuses more on improving automobile travel time, at the expense of buses and light rail.</td>
</tr>
<tr>
<td>63</td>
<td>Needs more emphasis on complying with State efforts on Climate Change. And on improving Air Quality from Transit emissions as well as SOV.</td>
</tr>
<tr>
<td>64</td>
<td>Need a train coming down I-15</td>
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<tr>
<td>65</td>
<td>Examining numbers using public transit is important. Routes should be altered based on use.</td>
</tr>
<tr>
<td>66</td>
<td>Increase traffic reduction measures in Mission Valley - it is a nightmare now and continued housing makes this area worse for years to come!!</td>
</tr>
<tr>
<td>67</td>
<td>Increase Trolley lines. Buses, lanes for bikes everywhere in the county and more rebates on electrical car purchases.</td>
</tr>
<tr>
<td>68</td>
<td>125 at 94 is a hazardous road. Please fix it and don't do it again.</td>
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<tr>
<td>69</td>
<td>One thing I have noticed that bike corridors are not maintained, brush over growth taking over path, pavement issues. The idea of new and more commuter path ways is great but if it is not going to be maintained, then what's the point. Looks great at first then a complete eyesore within a short amount of time. Same with on &amp; off ramps. San Diego personal appearance needs work. Compared to other states I say San Diego ranks rather low.</td>
</tr>
<tr>
<td>70</td>
<td>We need transportation to Del Mar from San Ysidro. This should be a short time not four hours to commute one way and about 6 buses to transfer. It's too much trouble, that's is why people rather just use their car.</td>
</tr>
<tr>
<td>71</td>
<td>Bike share needs to be in more areas. More shared bikes near transit and not downtown area.</td>
</tr>
<tr>
<td>72</td>
<td>Please add a trolley from San Diego Airport, thru Hillcrest, between San Diego Zoo and Balboa Park to Navy San Diego Medical Center.</td>
</tr>
<tr>
<td>73</td>
<td>I think the measures are fine, but I am concerned about the ability to actually make actual improvements. I think even more aggressive attention needs to be placed on the LOSSAN rail corridor; and, solving problems with taxi and UBER (and perhaps create a hybrid option with positive aspects from both options).</td>
</tr>
<tr>
<td>74</td>
<td>The longer cars sit idle on the freeway downtown traffic, the more they pollute the air. Thus expanding freeways w/ more lanes and improving highway transitions will actually help improve the air quality by reducing transportation time. There are only so many people that are going to be able to walk, bike, or use public transportation... some will be able to do it, but for many it will not be as practical for them so we need to emphasize road expansions and add more lanes to highways. Also adding bike lanes reduces lanes for driving and really is a setback for our ability to get around. Cycling on the streets is dangerous and only makes sense for those who are very experienced cyclists, otherwise you are going to be increasing road fatalities and bike accidents which are no minor consequence.</td>
</tr>
<tr>
<td>75</td>
<td>I think that the trains should be moved off the bluffs in Del Mar. It is unsafe to continue running them there. Turn the area into a park and trail.</td>
</tr>
<tr>
<td>76</td>
<td>Is it realistic to think people will use bikes as a major transportation mode, regardless of how many bike lanes or paths are built? Not practical.</td>
</tr>
<tr>
<td>77</td>
<td>People don’t work and live in the same place. They can’t afford to or wouldn’t even consider living in the same area. Not going to sell a home or condo to move closer to work where I don’t want to be near on weekends. You’re crazy to make that assumption. Also, your idea of “widening” the freeway is to make the lanes narrower. Try driving the stretch between Del Mar Heights road and Birmingham. The semi’s can’t fit in their lanes causing near misses. Then add in the idiot motorcycle lane splitters. It’s a disaster. Quit encroaching deeper into the hillsides around the freeways, ruining property values and creating unhealthy areas around the freeway and fix mass transit. I’m too old to ride a bike.</td>
</tr>
<tr>
<td>78</td>
<td>Improvements to east county are needed. Almost all highway and rail projects are for North County and golden triangle. Fix 125-94 interchange, 52, and 125 itself. At rush hour due to bad design and stripping of lanes is always gridlocked between 94 and I-8.</td>
</tr>
<tr>
<td>79</td>
<td>Expand light rail in south San Diego, specifically east/west rail line through Chula Vista. LA Metro transportation plan is great and should be a model for San Diego.</td>
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Online Survey - Comment Prompt 2

<table>
<thead>
<tr>
<th>#</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>80</td>
<td>A large portion of San Diego County’s working population lives in East Chula Vista/Eastlake/Otay Ranch. This area should be connected, by rail, to the downtown areas (military bases included) in which these people work. The Rapid Bus concept is poorly conceived and under utilized because it relies on the same congested roadways that are already congested. It essentially makes those living in the South Bay feel like second class citizens.</td>
</tr>
<tr>
<td>81</td>
<td>Presently Surfliner trains overnight at Santa Fe Depot, creating severe noise and pollution for thousands of downtown San Diego residents. A new layover facility is urgently needed, away from the growing city core. This new facility has been mandated by the City since 1983 and planned by Caltrans since 2001; it must be delivered!</td>
</tr>
<tr>
<td>82</td>
<td>Not sure that each community should share costs equally as wealthier areas of the county could more easily carry a greater burden of the cost</td>
</tr>
<tr>
<td>83</td>
<td>Car centric transportation planning is wrong. The measure must be how many we can get to stop driving, especially driving alone and on to mass transit by spending money on non-automobile transportation</td>
</tr>
<tr>
<td>84</td>
<td>Too much feel good stuff. Just build and maintain roads. The Sprinter has done more harm to North County traffic than it will ever improve the situation.</td>
</tr>
<tr>
<td>85</td>
<td>Gridlock on the freeways is not acceptable. What are we doing to fix it?</td>
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<tr>
<td>86</td>
<td>Excess diversion of funds to bicycles and rail.</td>
</tr>
<tr>
<td>87</td>
<td>Measures and goals look good for the area.</td>
</tr>
<tr>
<td>88</td>
<td>Please host more workshops for public input on the 2019 Regional Plan. The community wants to be involved and hosting one workshop in the middle of the day is not enough. We want to see a transit-first 2019 regional plan put on the table, this is what we are hearing from the community in City Heights.</td>
</tr>
<tr>
<td>89</td>
<td>Hurry!</td>
</tr>
<tr>
<td>90</td>
<td>SANDAG seems to waste so much taxpayer money on job justifying reporting, outreach programs, bureaucracy etc., and not enough on results, and being held accountable on our grossly inadequate roads and freeways.</td>
</tr>
<tr>
<td>91</td>
<td>Have more workshops in the evening. Reach out to the community.</td>
</tr>
<tr>
<td>92</td>
<td>I like the plan. Good job.</td>
</tr>
<tr>
<td>93</td>
<td>Change meetings days and times after 3pm. Convenienct for students. No cost transportation passes. Make the questions easier</td>
</tr>
<tr>
<td>94</td>
<td>Meetings should start later after 3pm. As a student I can’t make it to the 1pm meeting since I am still in school. Make the questions easier to respond to. Bring back the NO cost transit bus passes.</td>
</tr>
<tr>
<td>95</td>
<td>See earlier comment. This planning agency is a sham.</td>
</tr>
<tr>
<td>96</td>
<td>see my last answer</td>
</tr>
<tr>
<td>97</td>
<td>See my previous comments.</td>
</tr>
<tr>
<td>98</td>
<td>Same as the &quot;comments&quot; section.</td>
</tr>
<tr>
<td>99</td>
<td>Do not know enough.</td>
</tr>
<tr>
<td>100</td>
<td>Dar mas prioridad a los ciclistas y mejorar las pistas y freeways, ya que en mucho de ellas su estado es muy mala. Ademáas que halla mas talleres para informar a la comunidad de que esta pasando en nuestra comunidad. Give more priority to bicyclists and improve roads and freeways, as many of them are in poor condition. Also, have more workshops to inform people what is going on in our community.</td>
</tr>
<tr>
<td>101</td>
<td>Por favor tengan sus juntas en la tarde o fin de semana. Please have your meetings in the afternoon/evening or on the weekend.</td>
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<tr>
<td>102</td>
<td>El proceso nos confunde, me gustaría que nos informaran en horarios y tener talleres en la tarde y que fueran mandatorias los talleres de informacion. The process is confusing. I would like to be informed about times and that the workshops are held in the evenings, and make these informational workshops mandatory.</td>
</tr>
<tr>
<td>103</td>
<td>Por favor mas tayeres con un horario mas accesible que todas las personas puedan asistir, por las tardes de fines de semana. Please have more workshops with a time that is more convenient for everyone to attend, in the evenings or on weekends.</td>
</tr>
</tbody>
</table>
Since motor vehicles are the biggest source of GHG emissions in the region, the plan must capture and measure changes in VMT that result from implementation of the 2019 RTP. This is required by state law. 

Monitored and reported, but reporting on changes in the region's overall GHG emissions is the metric SANDAG should judge the plan's implementation and performance on. 

Per capita emissions might remain the same or even go down, but the region's overall GHG emissions would increase or go down as the region's population grows or decreases. Per capita GHG emissions should be monitored and reported, but reporting on changes in the region's overall GHG emissions is the metric SANDAG should judge the plan's implementation and performance on.

Per capita emissions will vary along with changes in the region's population. Basing plan performance on per capita emissions would give the public misleading information on the plan's effectiveness, since per capita emissions might remain the same or even go down, but the regions overall GHG emissions would increase or go down as the region's population grows or decreases. Per capita GHG emissions should be monitored and reported, but reporting on changes in the region's overall GHG emissions is the metric SANDAG should judge the plan's implementation and performance on.

Vehicle Miles Traveled (VMT): Since motor vehicles are the biggest source of GHG emissions in the region, the plan must capture and measure changes in VMT that result from implementation of the 2019 RTP. This is required by state law.

Hope this input helps you develop the most effective RTP update possible.
David Haynes
Long Range Planning Manager, Atlanta Regional Commission
David Haynes has been with the Transportation Access and Mobility Group of the Atlanta Regional Commission (ARC) since June 2001. In his current role, he is responsible for overseeing development of the Regional Transportation Plan for the 20-county Atlanta metropolitan planning area and coordinating those efforts with other agency initiatives. The group he manages works directly with city, county, state and federal agencies; transit operators; elected officials; consultants; and the public to define regional goals, policies, and priorities for transportation funding. Prior to joining ARC, he worked in the private sector as a transportation planning consultant with the firms of Post, Buckley, Schuh & Jernigan and Day Wilburn Associates for a combined nine years. David earned his Bachelor’s and Master’s degrees in Civil Engineering, with an emphasis on transportation, from Auburn University.

Rosella Picado
Associate Vice-President, WSP
Rosella Picado is a Technical Principal with the Systems Analysis Group at WSP USA. She has 20 years of work experience in transportation planning, travel demand modeling and forecasting, and project management. She has led the conceptual and technical development of urban and statewide models, including traditional trip-based models and activity-based travel demand models. Rosella has applied regional and statewide models to support a variety of planning studies, such as congestion pricing, HOV/HOT lane conversions, long-range regional plans, and fixed guideway transit projects.

Eric Pihl
FHWA Resource Center Freight and Transportation Performance Management Team
Eric Pihl is a member of the Freight and Transportation Performance Management team, one of several teams within the Federal Highway Administration’s Resource Center. He provides technical assistance, technology deployment, and training to partners and customers in all areas of freight, asset management, and transportation performance management. Eric also provides support to state and local agencies in the development, refinement, and application of travel forecasting and planning analysis methods. Eric has contributed to national research projects related to forecasting and the integration of planning, land use, and operational analysis tools. He holds graduate degrees in urban planning and transportation engineering from Georgia Tech.

Dr. Sherry Ryan
Professor, City Planning and Director, School of Public Affairs, San Diego State University (SDSU)
Dr. Sherry Ryan was appointed Interim Director of the SDSU School of Public Affairs in summer 2017. Dr. Ryan joined the school’s faculty in fall 2002 as an Assistant Professor of City Planning. Her research interests focus on active transportation planning, travel behavior/land use interactions, and community health. She has published numerous journal articles on travel behavior, land use patterns, and the built environment’s effects on health. She also has served as a consultant project manager for local and regional planning efforts in Southern California, Arizona, and Mexico, including the City of San Diego’s 2013 Bicycle Master Plan update, the first SANDAG Regional Bike Plan in 2010, and multijurisdictional planning efforts in Guadalajara, Jalisco and Leon, Guanajuato. One of her recent projects – the City of San Diego’s Pedestrian Crossing Policy Update – received the Center for Disease Control and Prevention Excellence in Pedestrian Safety Research Award in 2013. Dr. Ryan earned her undergraduate degree at Princeton University, and an M.S. and Ph.D. at the University of California, Irvine.
Jeff Shelton
Associate Research Scientist, Texas A&M Transportation Institute (TTI) and Program Manager, Research and Implementation Office in El Paso
Jeff Shelton received his Bachelor and Master of Civil Engineering degrees from the University of Texas at El Paso and is currently a Ph.D. student at New Mexico State University. His career experience includes leadership roles in network-wide simulation modeling, freeway corridor management, managed lanes, operational planning, and border studies. Mr. Shelton is considered a leading expert in multi-resolution modeling and has provided FHWA sponsored dynamic traffic assignment workshops for various DOT and MPO personnel that focus on multi-resolution modeling concepts and policy; transportation needs of the elderly; techniques for the evaluation of transportation systems and performance measurement in transportation planning. His research also addresses issues of equity in transportation policy.

David Vautin, AICP
Principal Planner/Analyst, Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG)
David Vautin has led MTC/ABAG efforts in the fields of performance assessment and performance monitoring throughout the past seven years. David’s work has been particularly influential in the development of Plan Bay Area and Plan Bay Area 2040, the two most recent comprehensive long-range plans developed for the nine-county San Francisco metropolitan area. He also acts as the project manager for Vital Signs, the Bay Area’s award-winning performance monitoring initiative which tracks a comprehensive suite of metrics related to transportation, land use, economic development, environmental protection, and social equity. He received his M.S. in Civil Engineering from the University of California, Berkeley and his B.S. in Civil Engineering from Cornell University.
San Diego Forward: The 2019-2050 Regional Plan
Draft Transportation Network Performance Measures Peer Review Panel Comments

Wednesday, January 17, 2018
8:30 a.m. to 5 p.m.
San Diego Association of Governments, 401 B Street, Suite 800, San Diego, CA

Overarching Comments

• Reduce the number of key questions and performance measures. Focus on the key areas of concern for the region.

• Keep one or a small number of performance measures per key question. Other performance measures can be kept in a separate part of the plan.

• Recommendation for using significant variation in the network scenarios so the performance measure can have a diversity of outcomes.

• Use graphics and simple descriptions to help answer the questions: what does this mean, and why does this matter.

a) Will the proposed performance measures be effective for distinguishing the performance of various scenarios?

• The measures are as good as the scenarios. If scenarios are quite different, then the measures will tell a story.
  o If scenarios are the same, you will box yourselves in.
  o Difficult to show variability across all scenarios.
  o If measures are applied to the affected population, then you will see variability in scenarios.

• Streamline the number of measures that you have; with more measures, you are paralyzed by data. The simpler, the better (Primary Metrics: mode share, congested delay, safety, equity measure, greenhouse gas [GHG]/per capita, public health (7a-b), and State of Good Repair and/or Resiliency).
  o Measures should be consistent over time, use quality data, and be easy to explain.
  o Metrics to assess what the key social equity measure that is the most important. Question 5 is one to explore.
  o One topic area, one measure.
  o Fewer measures can produce better discussion and fewer measures equal less opportunity for conflicting measure results.
- For each scenario, how much capacity is added by mode? Since bike and walk (and potentially transit) mode shares are relatively small, should we be using supply measures, as opposed to behavior. The capacity by mode for these networks is so vastly different, why would we expect similar performance across modes? Almost impossible to compare. Is there a way to include some measure of capacity? Consider quality of the network.

- (6) Trying to compare these across scenarios, you may not learn anything. But comparing the preferred scenario, looking if the trends are going in a favorable direction.

- May want to look at how the plan would perform under different scenarios—technology, economy, alternative futures. Look at bookends.

- Evaluation criteria need to relate to Performance Measures.

b) Do the proposed performance measures address plan goals, policy objectives, and comments received?

- Fixing America’s Surface Transportation (FAST) Act monitoring assessment can be done as an appendix to the plan itself.

- (1b) Change to delay instead of *significant* level of delay (balance with the FAST Act requirement). “Excessive delay”. Mostly a vehicle based measure. Most other measures are multimodal.

- Address the equity related metrics by focusing one questions on equity. Further, what is the main concern to be reflected within this measure—environment? Mobility? Accessibility?
  - (5a) Change in income will always show disparity of income groups, but we need a way to proportionally address the equity issue.

- Do you want to emphasize access or outcomes?
  - Having appropriate denominator for number of people who have access – “available persons”—if people are not in access sheds, then they should not be counted in the measures.
  - Percentage of jobs within 30 minutes of transit travel time. Meaningful, yes. Perhaps more useful than the availability.
  - (6a, 6b) Provide the ability to test the availability and accessibility of a service.
  - (6a-c) Not outcome based, but asks if the plan is providing the infrastructure that would influence mode choice.
  - (6d) Does not make sense to keep with the land use assumptions being held constant.

- Share of employment/schools and share of retail in 15 minutes.
  - Maybe do not need to report for drive alone as it probably will not change much—maybe just transit?
  - Spurred discussion on putting other numbers in the appendix.

- Regional Strategic Planning Model tool from Oregon—Atlanta Regional Commission is part of a consortium nationwide to build out for autonomous vehicle. Transit numbers within percent of activity-based modeling. VisionEval—designed as policy level screening tool to attempt to deal with uncertainties.

- Autonomous Vehicles – did not have recommendation on quantitative methodology.
c) How could these proposed performance measures be improved, either generally or in response to comments received from SANDAG working groups, Policy Advisory Committees, and the public?

- (1) Is there a way to pull these key questions apart so that they are mutually exclusive? With one mode’s improvement, it may affect another mode.

- Measure (1a) Consider change in travel time, or delay, as opposed to a travel time only metric.
  - This measure is easily understood but may not be very different between scenarios (bike/ped as an example). Travel time is dependent on access to that mode. Applies to transit, walk, and bike, at least.
  - Consider addressing disadvantaged communities as targeted populations for this measure.
  - (7a relating to 1a) Consolidate the two?

- Federal measures
  - (2a) FAST Act includes telework, so consider including that in the measure.
  - (3) There are federal measures related to transit asset management and safety—where do these fit in to the overall performance measures?

- (2b) Every mode will have more trips in the future compared to base year. It’s not the number but the change in percent that matters. Non-Single Occupant Vehicle mode share percent is the federally recognized measure.
  - Regional mode share—focus on where the facilities are located and what type of mode share you are getting along those investment areas/corridors. Focus on the denominator.

- Look at mode share within mode capacity. What is the theoretical capacity of each mode. Are we adding service or options for the future to get ahead of the curve when it comes to the shifts in society and attitudes, and should we be paying attention to how many people transit could carry versus how much it is carrying today?
  - Counter, what does capacity tell you if mode share is not affected? Is the service effectively being used?

- (4b-c) Reliability: having the measure there helps you move toward federally established target. Explore the reliability metric and test sensitivities. Ways to express travel time variability that is more understandable. Consider renaming reliability measure so that not the same to Federal PMs (may cause confusion between the two if keep measure the same since baseline and methodologies are different).
  - Reliability measure—did not have specific recommendation.
  - Does not have to be same as FAST Act. May be new model element.
  - Reliability—look at Maricopa Association of Governments approach.
  - Consider reliability as an index.

- (8a-b) How many people do not live within 15 minutes from a park? Will the measure tell you much? Because land use is not adjusted, will this move the needle? Will the scenarios be able to show a difference of access by transit? Perhaps just look at the transit.
  - 15 minutes for a transit trip is too short. The thresholds may need to be different by mode.
Percentage of those destinations with access to transit. Flip the question around. What share of the region’s medical facilities are within reach to households by transit?

Percentage of jobs within 30 min within reach to households by transit.

- (10a-b) Take the per capita GHG and slice it by source—incremental buildup of GHG reductions (land use, transit and road investment, climate/Transportation Demand Management programs, etc.—all different ways that you are meeting the state target).

- How do these measures relate to freight? Is there a better freight measure?

- Economic argument: try and boil down the road and bridge condition by pairing down to the Disadvantaged Communities areas. Take care of the basics to influence investment. Not model-able.

- As we do with high quality transit, consider high-quality bike facilities vs. all other bike facilities (high quality would be separated facilities-class 1 and class 4).

d) Should additional performance measures be considered or should proposed performance measures be dropped? Are there key questions that should be added, eliminated, or modified?

- Vibrant Economy Goal-- Consider a variety of assumptions related to State of Good Repair. Seems to be too siloed. Include in the conversation certain funding sources as flexible. Measure: Share of pavement in good condition, share of bridges in good conditions (federal asset management measures), etc. Federal measure.

- Consider deleting the benefit cost ratio (4a) and potentially reliability measures (and analyze outside of the PMs).
  - Benefit-Cost Ratio —more valuable at the project level. State of Good Repair might be a more valuable measure. Looking in disadvantaged communities – having other positive effects in investments.
  - (4a) Straightforward measure to some, others see as challenging measure. What is your audience?
  - Chamber of commerce likes the Benefit-Cost Analysis ratios but doesn’t resonate with public. Hard to explain it to people.

- (3) Try and quantify the safety benefits of bike/ped to try and scale down the injury/fatality rate. Based on research, put in X facility to realize X reduction in injury/fatality.
  - Perception of Safety (in particular relation to transit and walk/bike)—perceived and actual differ. How to measure? Survey data incorporation. How to address? Improving the perception of safety to influence choice riders.

- Social Equity Analysis—new goal area or measure geared toward equity. Does X measure equitably address X issue. Consider for 1a, mode share, access, air quality. 5a does not consider environment, time, and other aspects that address equity.
  - For the equity measures – Can we include the zero-car household variable? Perhaps add to 8a-b to include another layer of analysis for zero car households.

- (6a-6d) Instead focus on 7. Perhaps you will not see any travel distance to work change because you are not varying the land use.
(6d) If you do not change the land use, then you will not see a difference. Recommend dropping, or moving to tier-2 (appendix).

- Utilization measure—seated capacity—are we using our facility effectively? Would expose bad investments.
- If resilience is a core part of your plan, then perhaps a few metrics are useful; this is a hot topic. From a SANDAG perspective, perhaps resiliency gets wrapped up into State of Good Repair. Consider as part of the plan’s action element.
- MTC has papers on State of Good Repair influence on network performance.

**e) What performance measures best lend themselves for subregional analysis and what geographies are recommended?**

- Focus on severely congested areas—doing analysis in these areas/corridors. Could use Congestion Management Program (CPM) network, or develop thresholds of delay and focus on those areas.
  - Consider your CMP—are there measurements (bottlenecks, delay) that can be transferred to the PMs? Consider some of the metrics in the State of the Commute.
- System Performance within high-activity centers.
  - Consider looking at the Port areas as major distribution centers.
- Subregional geographies – consider land use typologies (ARC’s example of Livable Communities Initiative and how they looked at regional growth being captured in these Smart Growth areas—how many trips being made in those areas. Different than other parts of the region). SANDAG equivalent of Smart Growth Opportunity Areas.
  - Consider about five to ten subregional areas.
  - Subregional analysis helpful but do we have the resources to vet and view these areas? Need to have the confidence to vet these subareas.
  - If there is a subregional story to tell, then great. If not, stay at the regional level.
  - Interactive maps of some of these indicators to see hot spots.
- The more you throw into this analysis, the more you strip out.
- Equity groups – low-income.
  - Focus on disadvantaged populations – would the model be sensitive to all included subpopulations? Or would that be redundant? Senior and youth could be non-driving populations and low-income also.

**f) What lessons learned can you pass on to SANDAG from past similar work or experience?**

- The scenarios themselves should vary. Choose measures that will provide this variability. Revenue levels? Flexed State of Good Repair investment? Land Use? Give yourself some room to work with; don’t just narrow the discussion to TransNet projects.
- Measurements that are easy to calculate, easy to explain, with good, solid data. Simple.
- Graphics. Put up simple graphics to easily understand the issue/task.
• If you can, be okay with the willingness to fail. Do not be afraid of failure—can use metric that shows things moving in the wrong direction to advocate for more funding.

g) Are the proposed performance measure methodologies and data sources sound?

• (1a) Valuable to keep as a national benchmark.

• (3) Conservative assumptions for CV/AV market penetration. Perhaps not enough information to address safety at this point. Qualitative description in plan write-up of potential benefits, instead. Qualitative measures for some of these questions; for example, AVs and safety.

h) What recommendations do you have about how to communicate the data generated by the performance measures to the public in an easy to understand and meaningful way?

• Do not let the thumbs up/thumbs down dictate all. Provide 1-2 sentence descriptors of why the trend is good or bad so people know why you did XYZ and why it matters. (see ARC’s performance chapter in Plan).

• Images—create one short takeaway—why this matters.
  o MTC as an example of good visuals e.g. Vital Signs. MTC’s visualizations of investments to scenarios, going to look at adding scenario info to Vital Signs.
  o TTI – Color-coded dynamic maps, blue to red, easy and well-understood. Texas—heat maps with associated colors (red-bad; green-good).
  o Travel time sheds – concentric circles showing how far you can travel within peak time frames.
  o Interactive maps to show the data. Show how things get worse in No Build through the scenarios.

• Some of these metrics are correlated, so consider the trends of grouped metrics, and reference all other metrics in appendix. Two-tiered system of performance measures.
  o If there are remaining PMs outside of the primary metrics, you can still look at them outside of the PM analysis.

• (3) Opportunities to describe where these technologies might provide the greatest benefit by mode. Look at the literature, describe the range of assumptions, and consider the landscape where these benefits could see the largest improvement.
  o If you assume level of benefit within scenarios, be transparent.
## Key Questions and Draft Performance Measures

<table>
<thead>
<tr>
<th>2019 Regional Plan Goals</th>
<th>Key Question</th>
<th>Draft 2019 Regional Plan Transportation Network Performance Measures</th>
<th>Proposed for Inclusion in Social Equity Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative Mobility and Planning</td>
<td>1. Is delay reduced?</td>
<td>1a. Daily vehicle delay per capita (minutes)</td>
<td></td>
</tr>
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<td></td>
<td>2. Are more people walking, biking, using transit, and sharing rides?</td>
<td>2a. Percent of trips by walk, bike, transit, and carpool (work trips and all trips)</td>
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<td>2b. VMT (per capita and regionwide)</td>
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<td>3. Is the transportation system safer?</td>
<td>3a. Vehicular fatalities and serious injuries per capita</td>
<td></td>
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<td></td>
<td></td>
<td>3b. Non-motorized fatalities and non-motorized serious injuries per capita</td>
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<tr>
<td>Vibrant Economy</td>
<td>4. Do the transportation investments help to improve the regional economy?</td>
<td>4a. Benefit/Cost Ratio of transportation investments</td>
<td></td>
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<tr>
<td>Healthy Environment and Communities</td>
<td>5. Does the transportation network support smart growth?</td>
<td>5a. Percentage of population/employment within 0.5-mile of high-frequency (≤15 min peak and midday) transit stops</td>
<td>X</td>
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<td></td>
<td></td>
<td>5b. Percentage of population/employment within 0.25-mile of a bike facility (Class I and II, cycletrack, and bike boulevard)</td>
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<td>6. How does the transportation network support public health?</td>
<td>6a. Time engaged in transportation-related physical activity per capita (minutes)</td>
<td>X</td>
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<td>7. Is access to jobs and key destinations improving for all communities?</td>
<td>7a. Percent of population within 30 minutes jobs and higher education (via driving, transit) (total population, disadvantaged communities (seniors, low-income, and minority), and non-disadvantaged communities)</td>
<td>X</td>
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<td></td>
<td>7b. Percent of population within 15 minutes of goods and services (retail, medical, parks, and beaches) (via driving, transit) (total population, disadvantaged communities (seniors, low-income, and minority), and non-disadvantaged communities)</td>
<td>X</td>
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<td></td>
<td>8. Are greenhouse gas emissions reduced?</td>
<td>8a. On-road CO2 emissions (pounds/day) (per capita and regionwide)</td>
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The Social Equity analysis metrics include the total population, disadvantaged communities (seniors, low-income, and minority), and non-disadvantaged communities.
### Additional Draft Performance Measures

<table>
<thead>
<tr>
<th>2019 Regional Plan Goals</th>
<th>Draft 2019 Regional Plan Additional Performance Measures</th>
<th>Proposed for Inclusion in Social Equity Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovative Mobility and Planning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Average peak-period travel time to work (drive alone, carpool, transit, bike, and walk) (minutes)</td>
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<td>X</td>
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<tr>
<td>B. Average travel times to/from tribal lands (minutes)</td>
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<td>C. Average travel times to/from Mexico (minutes)</td>
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<td>D. Average travel times to/from neighboring counties (Imperial, Orange, Riverside) (minutes)</td>
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<td>E. Average travel times to/from military bases/installations (minutes)</td>
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<tr>
<td><strong>Vibrant Economy</strong></td>
<td>F. Change in percent of income consumed by transportation costs</td>
<td>X</td>
</tr>
<tr>
<td><strong>Healthy Environment and Communities</strong></td>
<td>G. Percentage of population/employment within 0.5-mile of a transit stop</td>
<td></td>
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<td></td>
<td>H. Percent of population engaging in more than 20 minutes of daily transportation related physical activity</td>
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SAN DIEGO FORWARD: THE 2019-2050 REGIONAL PLAN – EMERGING TECHNOLOGIES WHITE PAPER

Introduction

The Regional Plan is a federally- and state-mandated document that presents the overall vision for how the San Diego region will grow through 2050, including all transportation-related investments that will be needed to support that vision. It is updated every four years, and must be fiscally constrained, meaning the cost of projects and programs included must be supported by current revenue sources as well as reasonably expected new sources.

This report provides an overview of important transportation technology developments that should be considered in the development of San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan). A white paper on Emerging Technologies is included as a reference document to help inform the development of the 2019 Regional Plan (Attachment 1).

Discussion

In order for the SANDAG Board of Directors to determine the final combination of projects to fulfill the vision of the Regional Plan, several Revenue Constrained Transportation Scenarios will be developed for evaluation and consideration. The cost of projects and programs included in these scenarios must be supported by current revenue sources as well as reasonably expected new sources. Historically, this process has focused on developing lists of projects from all modes (transit, highway, biking, walking, etc.) and prioritizing the timeframes for all projects over the 30-40 years covered by the Regional Plan.

There are many new developments in transportation technology that will need to be considered as part of this process for the 2019 Regional Plan as well. The flowchart below visually depicts the 2019 Regional Plan development process and how the consideration of technologies is integrated into the process.
Emerging Technologies White Paper

As described in the white paper, technology is influencing every aspect of our lives including how we travel. The rapid adoption of the smartphone in the United States market has enabled transportation innovation that we see today, such as on-demand mobility services like Uber and Lyft. Additionally, nearly every major auto manufacturer has announced production of autonomous vehicles (AVs) as early as 2019.

The Emerging Technologies White Paper includes several areas of innovative mobility concepts for consideration in the 2019 Regional Plan development process. It presents technological and societal trends that have the potential to influence or change future travel and research that demonstrates how many of these technological advancements have the potential to improve safety, mobility, and efficiency. At the same time, it showcases the need for proactive planning and policies to move the region toward achieving the vision, goals, and policy objectives established by the Board of Directors for the 2019 Regional Plan.

The white paper contains three sections:

1. **Technology and Societal Trends Impacting Transportation**: This segment explores the rapid change in the transportation sector brought about by advancements in Information and Communications Technology and vehicle technologies that have made way for several key mobility trends:

   a. **Mobility as a Service (MaaS)** – is the idea of providing people with on-demand access to a wide range of public and private shared mobility services. Rather than having to locate, book, and pay for each mode of transportation separately, MaaS platforms allow users to plan and book door-to-door trips using a single application that provides the best transportation option based on real-time conditions and the users’ preferences (time, convenience, cost, etc.).

   b. **Vehicle Technologies** – such as Zero Emission, Autonomous, and Connected vehicles.
c. **Smart Cities and Transportation Systems** – smart cities and transportation systems are connected and use Information and Communications Technology to enhance the quality and performance of services and overall efficiency of operations. The use of technology itself does not make a city or transportation system smart – rather, it is how an agency uses data to improve planning, investment, and operational decisions, and engage more directly with the public.

2. **Policy Considerations**: This section explores the planning, policy, and investment considerations that can leverage these trends in support of the region’s transportation objectives. Technology is rapidly changing the nature and use of the transportation system, as well as travel patterns. As a result, policies and infrastructure investments will need to keep pace and require new ways of conducting business in partnership with the private sector.

3. **Look Ahead**: This portion explores technologies that are still under development, but relevant to the future of transportation. While not a focus of the white paper, it is important to monitor how these technologies are progressing. As more research and data becomes available, these technologies may be considered in future updates of the Regional Plan.

**Integrating Technology into the Regional Plan**

Development of the 2019 Regional Plan could include elements discussed in the Emerging Technologies White Paper along with an understanding of what can be evaluated with the SANDAG transportation modeling tools.

The traditional lists of projects could be evaluated with the addition of technology enhancements to optimize performance. The Policy Considerations section of the white paper presents a framework to do this by describing two possible approaches – seizing the opportunity or taking a passive approach. This is followed by policy and investment considerations that can prepare the region to take advantage of the opportunities and minimize the unintended consequences of a passive approach.

For example, under a scenario where cars and transit vehicles are fully connected, safety could be significantly improved while reducing congestion and greenhouse gas emissions. On the contrary, a lack of connectivity could result in a scenario with more congestion due to vehicles competing with each other for roadway space and result in inefficient use of the system.

**Regional Modeling Tools**

As referenced above, some of the emerging technology concepts described in the attached white paper can be evaluated using travel demand modeling tools. The SANDAG travel models are tested for responsiveness or sensitivity to various inputs, which may be associated with emerging technologies. Within the SANDAG Activity Based Model or ABM, various inputs can be tested to help understand how changes in policies would influence future travel, including testing of pricing and sensitivity to travel costs; freeway capacity and travel time; transit frequencies and fares; and transportation demand management measures that would reduce road congestion (e.g., telework). Other tools in addition to the transportation model also could be used to evaluate future impacts of shared mobility services, vanpool and carpool incentives, and the availability of electric vehicle charging stations.
Next Steps

The Emerging Technologies White Paper is scheduled to be presented to the Regional Planning Committee and Board of Directors in February 2018. It also will be shared with SANDAG working groups, as well as interested stakeholders and the public, to help inform the development of the 2019 Regional Plan. It is expected that revenue constrained transportation scenarios will be developed in the coming months based on input received by policymakers and stakeholders on what they see as important for the transportation system, including their input on how to integrate technology into the scenarios.

CHARLES “MUGGS” STOLL
Director of Land Use and Transportation Planning

Attachment: 1. Emerging Technologies White Paper

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Emerging Technologies

WHITE PAPER
THE SAN DIEGO ASSOCIATION OF GOVERNMENTS
# Table of Contents

Introduction .................................................................................................................................................. 1

Technology and Societal Trends Impacting Transportation ................................................................. 3

- Mobility as a Service ......................................................................................................................... 4
- On-Demand Rideshare .................................................................................................................... 5
- Bikeshare ......................................................................................................................................... 7
- Electric bikeshare ............................................................................................................................ 7
- Carshare .......................................................................................................................................... 8
- Public transit ................................................................................................................................. 9
- Microtransit .................................................................................................................................... 10
- MaaS in Action ............................................................................................................................ 11

MaaS Opportunities and Challenges ................................................................................................... 13

- Vehicle Technologies ..................................................................................................................... 13
- Electric and Other Zero-Emission Vehicles .................................................................................... 14
- Autonomous Vehicles .................................................................................................................. 16
- Connected Vehicles ...................................................................................................................... 18

Vehicle Technology Opportunities and Challenges ............................................................................ 21

Smart Cities and Transportation Systems ............................................................................................ 22

- Transportation System Management and Operations ................................................................. 24
- Smart Cities and Transportation Systems Challenges and Opportunities ............................... 25

Policy Considerations ......................................................................................................................... 26

Policy and Investment Considerations ............................................................................................... 28

Look Ahead .......................................................................................................................................... 29

- Hyperloop ..................................................................................................................................... 29
- 3-D Printing .................................................................................................................................. 29
- Augmented Reality ......................................................................................................................... 29
- Delivery Robots ............................................................................................................................. 29
- Drones and Flying Cars ................................................................................................................. 29
Figures

Figure 1 .................................................................................................................................................. 1
Figure 2 .................................................................................................................................................. 4
Figure 3 .................................................................................................................................................. 5
Figure 4 .................................................................................................................................................. 6
Figure 5 .................................................................................................................................................. 7
Figure 6 .................................................................................................................................................. 8
Figure 7 .................................................................................................................................................. 9
Figure 8 .................................................................................................................................................. 11
Figure 9 .................................................................................................................................................. 12
Figure 10 ............................................................................................................................................... 14
Figure 11 ............................................................................................................................................... 15
Figure 12 ............................................................................................................................................... 15
Figure 13 ............................................................................................................................................... 16
Figure 14 ............................................................................................................................................... 17
Figure 15 ............................................................................................................................................... 19
Figure 16 ............................................................................................................................................... 20
Figure 17 ............................................................................................................................................... 23
Figure 18 ............................................................................................................................................... 22
Figure 19 ............................................................................................................................................... 24
Introduction

The pace of technology is moving more rapidly than anyone could have predicted. In the early 20th century, it took nearly 75 years for technologies such as the telephone and household stove to reach market penetration (Figure 1). Today, consumer electronics are being adopted by the market at a far quicker rate. As of 2016, 95 percent of U.S. adults (age 18 and over) owned a cell phone, and smartphone ownership reached 77 percent.\(^1\)

Technology is influencing every aspect of our lives, including how we travel. The rapid adoption of the smartphone in the U.S. market has enabled transportation innovation such as on-demand mobility services like Uber and Lyft. Additionally, nearly every major auto manufacturer is racing toward production of autonomous vehicles (AVs), anticipating having AVs commercially available as early as 2019. Conservative estimates for AV adoption forecast 90 percent market penetration within the next 50 years.

Technology Adoption in the U.S.

[Figure 1. Technology adoption has rapidly increased over the last several decades]

The objective of this white paper is to present technological and societal trends that have the potential to radically change how the region’s transportation system is used in the future, and to outline potential policy considerations that will enable the region to harness the benefits and reduce the negative aspects of these trends. This paper presents research that demonstrates how many of these technological advancements have the potential to improve safety, mobility, and efficiency. However, without proactive planning and policy interventions, these technologies could move the region away from its objectives by increasing sprawl, vehicle miles traveled (VMT), and greenhouse gas emissions (GHG), and by limiting access for disadvantaged communities.
This white paper contains three sections:

1. **Technology and Societal Trends Impacting Transportation**: This section explores the rapid change in the transportation sector brought about by advancements in Information and Communications Technology (ICT) and vehicle technologies that have made way for several key mobility trends:
   a. Mobility as a Service
   b. Zero Emission, Autonomous, and Connected Vehicles
   c. Smart Cities and Transportation Systems

   Although each trend is described separately, they are interrelated and their combined impact is significant, so it is critical to consider how they work together. For example, ICT is the backbone for Mobility as a Service (MaaS) and Smart Cities, which both rely on better connectivity and “Big Data.” Shared vehicle fleets that are electric and automated offer significant opportunities for mobility, safety, and sustainability. Smart Cities and Intelligent Transportation Systems (ITS) provide the connected infrastructure that ultimately support the efficiency of a shared, electric, and autonomous transportation future.

2. **Policy Considerations**: This section explores the planning, policy, and investment considerations that can leverage these trends in support of the region’s policy objectives. Technology is rapidly changing transportation, so policies and infrastructure investments will need to keep pace, requiring new ways of conducting business in partnership with the private sector.

3. **Look Ahead**: This section explores technologies that are still under development, but relevant to the future of transportation. While not a focus of this paper, it is important to monitor how these technologies are progressing. As more research and data becomes available, these technologies may be considered in future updates of San Diego Forward: The Regional Plan.
Technology and Societal Trends Impacting Transportation

In recent years, nothing has had a more profound impact on transportation than advancements in ICT. The expansion of the Internet and improvements in computing and wireless communications have made virtual activities a viable alternative to many physical activities, which has changed travel demand patterns. On one hand, ICT is reducing certain types of trips by enabling an increase in telework and social engagement online and by providing access to remote services like online education and healthcare. On the other hand, ICT has led to a significant increase in online retail activity, which may reduce some types of shopping related trips, but induces other types of trips – mainly freight and delivery. According to a recent survey, 51 percent of Americans prefer to shop online. In response to this shift in preference, traditional brick and mortar retailers are transitioning to an online presence, offering free shipping and next day delivery to meet the growing demands of their customers. High volumes of goods and expedited delivery can lead to an increase in traffic volumes if done without consolidation and, by 2045, it is expected that freight volume will increase by more than 40 percent. As such, new models for the delivery of goods are emerging. For example, Walmart partnered with Uber for delivery of goods, and Amazon Flex hires independent contractors to deliver packages in their personal vehicles. Similarly, online food delivery also is contributing to changes in travel demand. Third-party delivery platforms like Instacart, GrubHub, PostMates, and UberEATS allow grocery stores and restaurants to increase their distribution. As demand for online goods and services continues to grow, companies are contemplating entirely new production and delivery methods that could improve logistics like drones, delivery robots, and 3-D printing, described in the “Look Ahead” section at the end of this paper.

ICT also has provided a platform for the sharing economy to flourish, with innovative companies such as AirBnB and Task Rabbit fundamentally transforming the way consumers discover and purchase services. This is most notable in the transportation sector, where innovation is resulting in new shared mobility services that are being rapidly adopted in the market. In cities across the world it is possible to rent shared cars, shared bikes, or shared rides from individuals, on-demand, through a mobile application. These innovative, shared mobility services are providing communities with more travel choices, and their popularity is beginning to challenge long held beliefs about the need to own a vehicle to have personal mobility. The degree to which sharing a ride will trump individual ownership awaits to be seen, but this paper contemplates the trend toward a future where mobility is consumed as a service.

Perhaps the greatest impact that ICT will have on the future of transportation is the Internet of Things (IoT). IoT is a term that refers to a network of ordinary objects, like household appliances, cars, street lights, and traffic signals, that are embedded with Internet-connected electronics, sensors, or software that can capture, exchange, and receive data. The rapidly increasing number of connected devices and systems presents significant opportunities for transportation. Data and connectivity enable Smart Cities and intelligent transportation systems that offer a host of benefits such as reliability, operational efficiency, cost effectiveness, safety, and improved asset-management and planning, all of which is discussed in the "Smart Cities and Transportation Systems" section of this paper.
Mobility as a Service

Mobility as a Service (MaaS) is the idea of providing people with on-demand access to a wide range of public and private shared mobility services. MaaS enables a transition from the current paradigm, where vehicle ownership is all but required to enable people to freely move about their community, to a new mobility paradigm, where people have access to an array of transportation services, and where access can be purchased as-needed, is competitive with the private automobile, and provides more convenient, efficient, and potentially less expensive travel options. Proponents of MaaS imagine an ecosystem where public and private operators cooperate and where consumers have access to information that enables preferential choice. Rather than having to locate, book, and pay for each mode of transportation separately, MaaS proponents have developed mobile applications that aggregate data from service providers to enable users to plan and book door-to-door trips using a single application that provides the best transportation option based on real-time conditions and user preferences (time, convenience, cost, etc.) (Figure 3).
Figure 3. Mobility as a Service provides an integrated platform for trip planning and booking across modes

While shared mobility is not a new concept (e.g., transit, carpool, vanpool), technology has allowed for explosive growth and variance in business models in recent years, blurring the line between public and private transportation.

On-Demand Rideshare

On-demand rideshare services allow users to request a ride in real-time using a mobile application. They link passengers with available drivers based on trip origin and destination, identifying the quickest route and facilitating trip payment. On-demand rideshare generally falls under two categories: dynamic carpooling and ridehailing.

Dynamic Carpooling is an application-enabled service that conveniently matches drivers and passengers in real time, filling empty seats and reducing congestion and auto emissions. Dynamic carpooling applications facilitate cost sharing among travelers, but prohibit drivers from making a profit. Examples of dynamic carpool services that are becoming popular in California are Scoop and Waze Carpool.

Ridehailing services (e.g., Lyft and Uber) allow users to request rides from a hired driver. They are distinctly different from taxis in that they must be “e-hailed.” In California, these services are classified as Transportation Network Companies (TNCs). Ridehailing service offerings are changing rapidly (Figure 4). In the San Diego region, passengers can hail discounted shared rides (commonly referred to as “pooled” rides), solo rides, and luxury vehicle rides. Shuttle style service where the user walks to a particular corner or to a popular route to hail a discounted ride are available in other markets (e.g., Lyft Shuttle), and to some extent mimic services traditionally provided by public transit agencies. Uber and Lyft also have introduced monthly subscription services in some markets, which function similarly to monthly transit passes.
In just a few years, ridehailing services have established operations in over 600 cities across the U.S., with Lyft providing about 1 million rides per day and Uber providing over 5.5 million rides per day. Overall, TNCs provide service to over 80 percent of the U.S. population and deliver over 6 million rides per day. In comparison, Americans take about 27.7 million transit trips per day. However, to-date there’s insufficient evidence to indicate how widely available and equitable ridehailing services really are. More data is needed, particularly from the service providers, and ongoing pilot efforts to ensure these services are made available across all dimensions of a community’s population are being expanded to help inform policy development to align these services with the regional goals.

Figure 4. On-demand ridesharing is growing rapidly in the U.S.
Bikeshare

Bikeshare systems provide fleets of bikes to be rented for a short period before they are returned to the system. Providers use technology to automate locking/unlocking, collect payment, and identify the location of bikes. Technological improvements have led to dockless bikeshare systems that allow members to park and lock a bike wherever they want within a designated zone. Early dockless bikeshare providers include Ofo, LimeBike, Spin, and JUMP. Dockless bikeshare is expanding rapidly due to the minimal amount of capital investment required to launch a system. In the San Diego region, dockless bikeshare services are operating in several jurisdictions, with more planning to launch dockless bikeshare in 2018.

Electric bikeshare

Electric bikeshare systems are in the early stages of development. Park City, Utah launched the first all-electric station-based bikeshare system in July 2017, and the first dockless e-bike system became available in Washington, D.C. in September 2017. Similarly, electric scooter sharing services are gaining popularity in Europe, and can make it easier for people to travel more quickly when topography is challenging and parking is scarce.

Scoot in San Francisco is the only scootershare service operating in the U.S., and its users ride about 50,000 miles per month.9

Figure 5. Technological improvements are spurring the growth of bikeshare programs nationwide
Carshare

Carshare provides short-term vehicle rentals that are accessed via a mobile application. Rental rates generally include insurance, parking, and fuel or vehicle charging costs (Figure 6). **Round-trip** carshare services allow users to reserve and return a vehicle to the same designated parking spot (e.g., Zipcar). Alternatively, **one-way** carshare allow users to pick up a vehicle from one designated parking spot and return it to another designated carshare parking spot. **Free-floating** carshare services such as car2go, ReachNow, and WaiveCar allow users to pick up and park a vehicle anywhere within a designated service area. **Peer-to-peer** carshare services such as General Motors’ Maven; Croove, Getaround, and Turo allow private vehicle owners to rent their car by the hour or day to others within their community; adding another mode to the supply side of the transportation system.

![Figure 6. Carshare growth is helping to replace personal vehicle use](image-url)
Carshare providers are being encouraged to electrify their fleets in order to support cities with their sustainability goals. For example, BlueLA is an all-electric carshare service, consisting of one self-service kiosk and five parking spots, each with an electric charger, where members collect and drop off vehicles.\textsuperscript{10}

Carshare growth has slowed recently, which may be the result of competition with other shared modes of transportation. In San Diego, Daimler shuttered their car2Go carsharing service, citing regulatory challenges and competition from other shared modes, namely ridehailing services. As a result, carshare service operators are looking for ways to increase the use of vehicles, which is leading to innovative dual-use service models. For example, Green Commuter, a Los Angeles-based operator, offers a fleet of electric vehicles to be used for commuter vanpooling during commute hours, and then reserved as carshare vehicles or used as corporate fleet vehicles during the off-peak period. Alternatively, Zipcar is now targeting commuters by offering monthly leases on its fleet of shared vehicles for weekly access between 5 a.m. Monday and 7 p.m. Friday, which come with free maintenance, gas, and parking.

**Public transit**

Public transit, the original shared mobility service, is the backbone of MaaS. High-frequency transit continues to be the most efficient way to move many people along popular routes from common origins and destinations. Other shared mobility services can complement public transit by serving different trip types and needs. Recent research conducted by the American Public Transportation Association (APTA) shows that the more people use shared modes of transportation, the more likely they are to use public transit, own fewer cars, and spend less on transportation overall.\textsuperscript{11}

Public transit systems across the country are experiencing a technological revolution that is resulting in improved operations and user experience. Leading agencies are using ICT to improve fare collection, scheduling, and routing of transit services. Agencies can track the location of their buses and trains, as well as how many people are riding a particular route and bus in real time. This information can be utilized to better predict how many buses will be needed on given routes at different times of the day, and can control when they arrive at a stop so that fewer are too late or too early. Real-time information enabled by ICT also improves the user experience by providing riders with accurate information to support trip planning and trip reliability (Figure 7).

![Figure 7. Technology improves transit operations and the customer experience (Source: Government Technology)](image_url)
The spectrum of public transportation vehicles and features also is changing as a result of technology – for example, the implementation of demand-responsive transit with smaller vehicles along less-traveled routes where high-frequency transit isn’t warranted or is too costly to operate.

Microtransit

Microtransit is an on-demand shuttle service that carries between 5 and 12 passengers and typically operates along a dynamically generated route or within a designated zone (Figure 8). Microtransit services vary in their business models. Chariot, a privately-owned and operated service of Ford Smart Mobility, is focused on commuters and currently serves the cities of Columbus, Seattle, San Francisco, Austin, and New York. Via, on the other hand, is an example of an innovative mobility service provider that directly partners with public agencies to plan and implement on-demand, transit services within a community. Other companies offer technology solutions, such as vehicle routing; fleet management; and booking services that enable government agencies or private fleet operators to enhance their existing transit services.

Some microtransit service providers are fulfilling short-distance trips within smaller service areas with Neighborhood Electric Vehicles. The Free Ride Everywhere Downtown (FRED) in San Diego uses six-passenger Polaris Gem zero-emission vehicles (ZEVs) that can be hailed using a mobile application or by waving down a vehicle within the fleet’s operating area. FRED is typically used to fulfill trips under 2 miles, and now services almost 400 riders a day. FRED recently was granted renewed funding to grow its fleet to 30 by 2020.12
Figure 8. Microtransit services are becoming more common and supplementing traditional transit.

MaaS in Action

Whim is the most comprehensive MaaS platform in use today in the City of Helsinki in Finland, which aims to make automobile ownership unnecessary by 2025.\textsuperscript{13} Launched in 2016 by MaaS Global, the Whim application facilitates trip-planning and payment across all shared modes of public and private transportation within the city (i.e., transit, taxis, carshare, and bikeshare). Users of the application can enter a destination to select and pay for the best mode or combination of modes to cover the door-to-door journey. Users can prepay as part of a monthly subscription (like a monthly transit pass) or can pay as they go using a bank account linked to the service.
Transit agencies and cities of all sizes across the U.S. are exploring MaaS as a way to enhance public transit and reduce drive-alone trips. LA Metro owns and operates a bikeshare system that can be accessed with their transit fare card, TAP, creating a seamless transition from transit to bike. LA Metro also partnered with Via to provide on-demand microtransit service that will connect commuters to and from select Metro stations. The City of Centennial in Florida partnered with Xerox and Lyft to provide commuters with an integrated application to book a free Lyft ride to light rail stations. The Dallas Area Rapid Transit’s GoPass Mobility On Demand Project will fully integrate ride-sharing services into its GoPass ticketing app. SANDAG has developed a Regional Mobility Hub Strategy, which illustrates how MaaS can be implemented in the San Diego region to support transit investments and improve mobility in a variety of community settings (Figure 9). SANDAG also partnered with Waze Carpool and Uber to enhance traditional Transportation Demand Management (TDM) programs through on-demand services.

This influx of public-private partnerships and the convergence of shared mobility services makes MaaS more of a reality. Some estimates project that MaaS could reduce auto sales by more than 30 percent by 2030, and many major auto manufacturers are pivoting to become mobility service providers. Ford Smart Mobility LLC was developed in 2016 to expand Ford’s business model and invest in microtransit service (Chariot), carshare service (GoDrive), bikeshare (GoBike) and a partnership with Lyft to test AVs. General Motors developed Maven carshare service, invested millions of dollars in Lyft, and has announced plans to deploy thousands of autonomous electric vehicles for ridesharing. Toyota is at work developing Ha:mo, a MaaS concept that provides shared fleets of small neighborhood electric vehicles for various types of trips in urban environments as a complement to public transit.
MaaS Opportunities and Challenges

Shift from one commute mode to multiple: The surge in application-enabled mobility services has created expectations for more personalized transportation on demand. This may impact mode-specific fare affinity programs, such as monthly transit passes, but provides a significant opportunity for MaaS.

Decreased vehicle ownership: Shared mobility user surveys indicate that access to these services decreases their likelihood of purchasing a vehicle and increases their likelihood of selling a vehicle.

Decreased demand for parking; increased demand for curb space: Fewer privately-owned vehicles means less demand for traditional parking. However, these services are impacting curb space, which conflicts with other modes of transportation in the roadway and creates bottlenecks with passenger pick-up and drop-off. Cities are rethinking how curb space is used and are dedicating areas for pick-up and drop-off zones.

Limited access for the unbanked and those without smartphones: MaaS requires credit/debit for payment and a smartphone for accessing the service, which presents limitations for the unbanked and those without a smartphone. Further, most private mobility service providers are not sharing data about how their services are used so it is unknown if disadvantaged communities are benefiting from these services.

Shared mobility trips are replacing single-occupant vehicle trips and transit trips: Shared mobility services tend to concentrate in urban areas, and research shows that carshare, bikeshare, and ridehailing replace transit trips in these areas. Recent research points to about 60 percent of ridehail trips that either would not have been taken, or that were formerly transit, bike, or pedestrian trips. In dense cities like Washington, D.C. and New York City, bikeshare has replaced some transit trips. However, in less dense cities, such as Portland and Denver, bikeshare users reported that 26 percent to 47 percent of their trips would have been car trips.

VMT impacts of some shared vehicle services are unclear, and pricing will be an important lever to achieve reductions: Data access restrictions make it challenging to understand the impacts of shared mobility on overall VMT. Studies from the University of California, Davis and the APTA link ridehailing services to declining transit ridership, as well as increases in VMT and congestion.

Increased comfort with pooled trips: People are growing accustomed to sharing rides with strangers, and do not mind sharing a ride for the right price. This cultural shift could lead to an increase in ridesharing with the right incentives in place. Encouraging more pooled trips will likely require updated pricing mechanisms.

Numerous public-private partnerships across the world are demonstrating how services can come together to support each other, reduce operational costs, and better meet the needs of consumers.

Uncertainty about service provider participation: Mobility service providers have been reluctant to share information beyond their individually branded mobile applications and the reality of a single platform to locate, book, and pay for trips across multiple branded services remains elusive.

Vehicle Technologies

Vehicle technologies are advancing rapidly, with vehicles becoming increasingly safer, lighter, and more fuel efficient. New and diverse vehicle types are emerging in the market that meet the needs of specific types of trips, such as longer-distance commuting with multiple passengers versus very compact alternatives for solo
drivers traveling shorter distances (Figure 10). This section of the paper explores the trend toward vehicles that are zero-emission, autonomous, and connected. These technologies are addressed independently, given their unique applications, market forces, and policy considerations, although their futures are predicted to be intertwined given the synergies and benefits of combined application. For example, electric, connected, and AVs can be smaller and lighter, requiring less space for conveyance and storage (parking). This trend enables cities to rethink the way in which the public’s right-of-way for streets, sidewalks, and curb space are allocated, and can potentially help to facilitate a more comprehensive implementation of Complete Streets concepts that provide safe space for everyone and every mode.

![Figure 10. Ultra-compact electric carshare vehicle (Source: Toyota Global)](image)

**Electric and Other Zero-Emission Vehicles**

Zero-emission vehicles (ZEVs), like plug-in electric vehicles (PEVs)\(^1\) and hydrogen fuel cell electric vehicles (FCEVs), play a big role in how countries, states, and local governments plan to cut GHG emissions. Technology innovations are underway across all vehicle types from passenger vehicles and vans to buses and trucks.

PEVs have gained the most traction amongst consumers and businesses so far, though it is still a nascent market. Major auto manufacturers released their first electric vehicle models in 2010, and now over 70 models are planned by automakers for model year 2020. As of May 2017, almost 300,000 ZEVs, primarily PEVs, were sold in California, comprising nearly half of the total U.S. market and about 30 percent of the expected 2 million vehicles sold globally.\(^19\)

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\(^{1}\) PEVs are vehicles that run at least partially on battery power and that battery can be recharged from the electricity grid or a renewably-powered charger. PEVs include both battery electric vehicles (BEVs), which are 100% electric powered by an onboard battery, and plug-in hybrid electric vehicles (PHEVs), which are fueled by both a battery and another fuel source (usually gasoline-powered internal combustion engine).
This growing ZEV market is creating a massive need for new charging infrastructure across the transportation network. Public and private investment is necessary to provide adequate charging and hydrogen-fueling infrastructure. Beyond the infrastructure needs for PEVs, transit operators will need to consider how to address range issues and overcome recharging electric transit buses. One such technology that addresses this issue is inductive charging, where a transit vehicle can recharge batteries by simply remaining over an inductive charging system at a transit stop or layover facility. Inductive charging will also be critical for AVs, particularly those AVs that are part of a shared rideshare fleet. An example of inductive or wireless charging is QUALCOMM's Halo™ technology (Figure 11).

![Figure 11. Static and in road Inductive Charging (Source: QUALCOMM)](image)

Local electric utilities play an essential role in the build-out of ZEV infrastructure that meets the growing demand, as the addition of grid-connected charging stations – whether at homes, businesses, or public sites – must be evaluated prior to operation to ensure that no localized grid impacts occur. Utilities also are at the forefront of vehicle-to-grid integration efforts that could eventually enable electric vehicles to plug in and supply power back to the grid in times of need. Some companies offer solar charging stations combined with energy storage to recharge vehicles using the sun (Figure 12).

![Figure 12. Chevy Volt plugged in to a renewable, portable charging station.](image)
Governments at all levels are taking steps to ensure the success of ZEV markets. In California, Governor Brown set a goal that the state should develop enough ZEV infrastructure to support 1 million vehicles by 2020, and 1.5 million ZEVs by 2025. California also enacted ZEV regulations that require 15.4 percent of all passenger vehicles sold in California to be zero-emission in 2025. In the U.S., a multi-state ZEV Memorandum of Understanding was signed by nine governors (California, Connecticut, Maine, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont), which commits to having 3.3 million ZEVs on the road by 2025. Together, these states represent about 30 percent of all new vehicle sales in the U.S. Internationally, India has committed to having 6 to 7 million electric vehicles on their roads by 2020, and will allow only electric vehicles to be sold by 2030. India is the world’s fifth-largest auto market. Additionally, governments in many countries – including China, France, Germany, Italy, Japan, Norway, South Korea, Spain, Sweden, the United Kingdom, and the United States – have enacted policies encouraging PEV sales.

Concurrent with government action, industry is making significant investment in advanced vehicle technologies and associated infrastructure. Vehicle manufacturers have taken notice of government commitments and are positioning themselves as future market leaders in ZEV transportation. Volvo has committed to produce only PEVs or hybrid vehicles in 2019. Volkswagen has committed $40 billion by 2022 to PEVs, AVs, and new mobility services. Daimler AG is spending more than $11 billion to bring at least ten new PEVs to market under its new Mercedes-Benz EQ sub-brand by 2022.

**Autonomous Vehicles**

A Level 5 AV (see Figure 14) can perform all functions of driving without intervention from a human. AVs use sensors, cameras, and GPS technology to read information about the surrounding environment and navigate to their destination with limited or no human assistance (Figure 13).

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*Figure 13. Characteristics of autonomous vehicles*
The advent of AVs is being driven by the private sector at a rapid pace. Vehicles with partial automation are already commercially available, and auto manufacturers claim they will have fully AVs (Level 5) commercially available as early as 2020 (Figure 14). Conservative estimates for AV adoption show a 10 percent to 20 percent market penetration by 2030, with AVs accounting for 10 percent to 30 percent of VMT.\\n
Presently, two models of AV adoption are being widely discussed: the shared fleet model, similar to how Uber and Lyft are manifesting; and the private car-ownership model. Both Uber and Lyft are heavily invested in advancing AV testing and deployment in partnership with auto manufacturers and technology companies. The absence of a driver could reduce their operational costs and ultimately bring down the price of trips for consumers. AVs also have applications for transit service providers. The future could bring fully-autonomous shuttles, buses, and other shared services that feed to light rail and commuter rail services, thus increasing access to, and the use of public transit services; and furthering the likelihood of the MaaS model discussed earlier in this paper.

![Figure 14. Levels of vehicle automation](image)

The potential benefits of AVs are numerous. AVs could increase mobility for the elderly, the disabled, and the transit dependent, eliminate many vehicle accidents, improve bike and pedestrian safety, revolutionize delivery services and logistics, and almost eliminate the need for concentrated parking facilities. By some estimates, a partially-automated fleet of vehicles could increase freeway capacity by 10 percent to 25 percent, while estimates for the capacity for a fully-automated automobile fleet range are as high as a five-fold increase.  However, these benefits will not materialize on their own. Without effective planning and policy intervention, AVs are just as likely to lead to an increase in total VMT, exacerbate urban sprawl, and increase energy consumption and GHG emissions.
Federal and state governments are struggling to keep pace with private-sector innovation and develop regulations that will ensure that common safety standards are adopted and uniformly applied in terms of vehicle design and operation on public right-of-way. The federal government has developed voluntary guidance on Automated Driving Systems that was updated in September 2017 and is expected to be updated again later this year, while Congress continues to work toward passing an AV bill. Last month, the Federal Transit Administration unveiled its five-year agenda for researching automation in transit – The Strategic Transit Automation Research (STAR). STAR is intended to encourage public transit agencies and manufacturers to begin researching and piloting automated buses.

Across the U.S., states are handling AV regulations differently. California has taken a very proactive role in developing regulations for testing and deployment, while other states have elected to take a hands-off approach and welcome testing and deployment without government intervention. Local and regional agencies are trying to understand how to prepare for AVs and what types of investments they should be making in the transportation system to prepare for the autonomous future. Some infrastructure improvements may be needed to support AVs, although these needs are not yet well understood. For example, faded or inconsistent lane markings, and damaged or inconsistent signage or lights might make it difficult for AVs to navigate. In May 2017, Caltrans issued a policy that will lead to a new state standard that makes roadway lane striping more visible to AVs; going forward, Caltrans will apply a six-inch wide painted pavement stripe, and minimize the use of ‘Botts dots.’ However, it is not yet well understood if other improvements to roadway infrastructure will be required to ensure AVs can operate safely and efficiently.

Ultimately, systematic AV deployment will require collaboration across all levels of government and with the private sector. One such effort is the United States Department of Transportation (U.S. DOT) Autonomous Vehicle Proving Ground Program. SANDAG partnered with the City of Chula Vista and Caltrans to be designated as one of ten U.S. DOT Autonomous Vehicle Proving Grounds in the country. The intent of the initiative is to inform and help foster a consistent approach across the nation toward the planning and policy development for AVs, and to do so by collaborating with the private sector to test AV technology and share data and best practices.

**Connected Vehicles**

Connected vehicles (CVs) can communicate to each other through in-vehicle and wireless technology (Figure 15). CVs communicate position, direction, and speed to give the driver or the vehicle the situational awareness to react to incidents, thus reducing the number of accidents and smoothing traffic flow. CVs also can communicate with smart infrastructure and other connected devices like smartphones or wearable technology, further improving safety across modes and smoothing transportation system operations.
CV technology is not only about improving operations for cars – it provides benefits across modes. For example, the software company Tome has partnered with Trek Bicycle to create an artificial intelligence or AI-based bicycle-to-vehicle communication system to help drivers get alerts to bicycles ahead in dangerous areas of the road. Similarly, Pedestrian to Vehicle communications have been demonstrated by Qualcomm and can provide information about a pedestrian’s location to all other travelers on the network, including approaching vehicles (Figure 16). The devices used may include smartphones, and new innovations from IoT being applied to wearable technology such as smart watches, wristbands, glasses, clothing, or others.

**Figure 15. Characteristics of connected vehicle technology**
CVs are not AVs, but AVs can be connected and may provide the greatest benefit in terms of safety and operations when they are connected. Cellular technology that enables a vehicle to communicate directly with a wide array of other objects is known as Cellular-vehicle-to-everything (CV2X) technology. CV2X complements other AV sensor technologies and directly connects vehicles to everything—including to each other (V2V), to pedestrians and people on bikes (V2P/V2B), to roadway infrastructure (V2I), and to the network (V2N). A connected AV not only would operate safely independently, but because of the constant communication between vehicles, the roadway, infrastructure, and other entities such as pedestrians and bicycles, it can operate as part of a larger safety ecosystem further discussed in the “Smart Cities and Transportation Systems” section of this paper.

CV technology has unique application for transit and for goods movement. One example of a CV application is platooning, which enables vehicles, including transit buses and trucks, to form “road trains” with decreased following distance and all vehicles in the “train” working cooperatively as one entity. The future could have smaller transit vehicles linked together, which would enable operators to dynamically adjust system capacity to increase or decrease depending on demand.

The U.S. DOT has been working toward vehicle-to-vehicle (V2V) communications with auto manufacturers for over a decade. In 2006, the U.S. DOT joined a partnership of automotive manufacturers, Crash Avoidance Metrics Partnership (CAMP), to develop and test prototype V2V safety applications. CAMP includes Ford, General Motors, Honda, Hyundai-Kai, Volkswagen, Mercedes-Benz, and Toyota. Until 2017, the U.S. DOT has been committed to Dedicated Short-Range Communications (DSRC) as the primary mechanism for vehicle safety applications. DSRC is a two-way, short- to medium-range wireless communications mechanism that permits very high data transmission critical in communications-based active safety applications. In 1999, the Federal Communications Commission allocated 75 MHz of spectrum in the 5.9 GHz band for use by ITS vehicle safety and mobility applications. Several manufacturers are actively developing and testing vehicle communication devices and CV applications, while others are developing vehicle-to-everything equipment that uses other forms of wireless communications, including WiFi. General Motors was the first to commit to integrating DSRC-based technology into its newer vehicles. Ford’s CEO
also has declared that all Ford vehicles, beginning with model year 2019, will be equipped with CV2X technology, allowing the cars to communicate with each other and to other devices.\textsuperscript{39}

In 2016, the National Highway Traffic Safety Administration issued a Notice of Proposed Rulemaking on V2V communications technology for new light vehicles, which is a major step toward mandating V2V communication systems in vehicles. However, CV infrastructure is not a part of the federal rulemaking, which means that state, regional, and local governments would need to invest and deploy roadside equipment and applications that would make vehicle-to-infrastructure (V2I) communications possible.

Thus far, public funding has been driving CV deployment of DSRC.\textsuperscript{40} Several pilot projects have been federally funded through the Connected Vehicles Pilot Deployment Program. In 2016, the U.S. DOT awarded $45 million to initiate a Design/Build/Test phase of the Connected Vehicle Pilot Deployment Program in three sites: Wyoming, New York City, and Tampa. The Wyoming Department of Transportation’s Interstate 80 CV pilot uses V2I and V2V connectivity to send alerts and dynamic traffic guidance to 400 equipped trucks along a busy freight corridor. New York City’s Department of Transportation uses V2V and V2I CV technologies to communicate with bus fleets, taxis, delivery trucks, and city vehicles to send out speed warnings and reduce fatalities in high-crash intersections. Tampa’s pilot project focuses on using V2V and V2I to improve safety and traffic conditions in downtown Tampa.\textsuperscript{41}

\textbf{Vehicle Technology Opportunities and Challenges}

\textbf{Electric vehicle infrastructure is not pacing with demand:} More public infrastructure to support PEVs is needed in the near term. To underscore the magnitude, analysts estimate the need for 125,000 to 220,000 publicly accessible PEV charging ports in California by 2020; whereas currently about 12,000 are available. AVs will likely be electric, creating demand for wireless or inductive vehicle-charging infrastructure in the long term.\textsuperscript{42}

\textbf{Hydrogen powered vehicles will enter the San Diego market:} Auto manufacturers will not sell their FCEVs in a metro-area until two to three hydrogen refueling stations are built. San Diego’s first commercial hydrogen station opened in late 2016, and a second station is in development. Expect passenger vehicle sales to expand in the next few years and vehicle demonstrations for fuel cell electric trucks and buses to begin in the next decade.

\textbf{AV and CV technology could improve safety and mobility:} 90 percent of accidents are caused by human error. CV/AV technology will dramatically decrease this number, increase roadway capacity, and increase mobility for low-mobility populations. CV2X technology enhances the benefits of autonomous driving by enabling communication across modes and the transportation network.

\textbf{AVs could increase VMT and urban sprawl without policy intervention:} Policy analysts warn, however, that the ease of travel anticipated with AVs could induce unprecedented demand for vehicle trips and increased VMT. As vehicle fleets become increasingly autonomous, the issue may be exacerbated by the increased ability to use travel time for non-driving tasks, and consumers may be willing to travel longer distances as travel time becomes more productive. Vehicles traveling between trips without occupants is another risk without policy that encourages higher occupancy.

\textbf{Shared AV fleet models are on the horizon:} Interrelationships exist across ZEVs, MaaS, and AVs, as several automakers have stated their intention to produce electric AVs and have partnered with ridehailing companies to introduce these vehicles into their fleets.
Decrease in parking, ticketing, and gas tax revenue: Public agencies may need to substitute and/or complement traditional revenue sources with use fees. The recently completed California Road Charge Pilot Program demonstrated the viability of a road charge model.

The emergence of electric vehicles, AVs, and CVs will impact vehicle form creating opportunities to rethink roadway design: Smaller, lighter vehicles that can travel closer together create opportunities for highways to handle more vehicles within existing rights-of-way. On local roadways, opportunities include retrofitting roads to accommodate neighborhood electric vehicles and reallocating space so that lanes no longer needed for moving or storing cars can be used for other purposes and modes.

AVs may require changes to infrastructure: AVs rely on clear and consistent pavement delineation and traffic control devices, as well as maintenance in a state of good repair, putting pressure on local and state government to invest in necessary improvements and ongoing maintenance.

Smart Cities and Transportation Systems

Smart Cities are connected cities that use ICT to enhance the quality and performance of public services, such as energy and transportation, in order to reduce resource consumption and increase responsiveness and overall efficiency of operations (Figure 17). The use of technology itself does not make a city smart – rather, it is how the city uses data to improve planning, investment, and operational decisions, and engage more directly with the public. For example, mobile applications can allow citizens to report issues to local agencies for quick response. Sensors on transit vehicles can monitor where vehicles are and when maintenance is required. Real-time data can improve transit trip planning and lead to increases in customer satisfaction. Data collected from sensors also can be used to improve traffic monitoring and help to optimize traffic flows to prevent roadways from becoming too congested. Smart Intersections combine advances in ICT to increase capacity, improve safety, and reduce fuel consumption and emissions. Strategies can include corridor signal timing coordination, predictive/adaptive arterial signal timing, and multi-modal intelligent traffic signal systems (Figure 18).

![Figure 18](source: Volpe)

![Source: Bicycle Dutch](source: Bicycle Dutch)
In December 2015, the U.S. DOT issued a “Smart City Challenge” that asked mid-sized cities to develop ideas for an integrated transportation system that would use data, applications, and technology to more effectively and efficiently move people and goods while reducing costs. Seven finalists were selected to work in partnership with the federal government and the private sector to develop and implement Smart City demonstration projects using emerging transportation technologies to address their most pressing transportation problems.43
Beyond the Smart Cities Challenge, local jurisdictions are beginning to recognize the need for a strategy, and are rethinking traditional planning efforts to better account for the impact of technology. Cities also are experimenting with different Smart City concepts through pilot projects and demonstrations that can help guide planning and policy development. For example, the City of Chula Vista has recently developed a Smart City Strategic Action Plan. This, combined with its federal designation as an Autonomous Vehicle Proving Ground in partnership with SANDAG and Caltrans, positions the City as a living laboratory to validate that technology works and provides a public benefit.

**Transportation System Management and Operations**

At the state and regional level, the concept of Transportation System Management and Operations (TSMO) is becoming the focus of transportation planning. For many decades, the development and operation of transportation systems has been considered in terms of physical infrastructure. The solution to congestion and capacity issues has been to expand or build new facilities. This is not likely the optimal strategy for the future, as transportation financing becomes more constrained, and as technological infrastructure and Big Data are better facilitating new approaches to address capacity issues. TSMO is a regional application of the Smart Cities concept, and applies technological solutions to roadway infrastructure to better plan, operate, and maintain the system. TSMO uses IoT and data analytics to improve performance and manage demand for the overall transportation system. TSMO incorporates both transportation system management and TDM solutions to dynamically influence the entire trip chain, from mode choice to route choice – even the cost of the trip and parking (Figure 19).

<table>
<thead>
<tr>
<th>Active Demand Management</th>
<th>Active Traffic Management</th>
<th>Active Parking Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Ridesharing</td>
<td>Dynamic Lane Use Control</td>
<td>Dynamically Priced Parking</td>
</tr>
<tr>
<td>On-Demand Transit</td>
<td>Dynamic Speed Limits</td>
<td>Dynamic Parking Reservation</td>
</tr>
<tr>
<td>Dynamic Pricing</td>
<td>Queue Warning</td>
<td>Dynamic Way-Finding</td>
</tr>
<tr>
<td>Predictive Travelor Information</td>
<td>Adaptive Ramp Motoring</td>
<td>Dynamic Parking Capacity</td>
</tr>
</tbody>
</table>

*Figure 19. TSMO uses technology to manage the entire trip process (Source: FHWA)*

Although new technology and increased data collection offer opportunities for safer and more efficient cities and transportation systems, it also creates new types of vulnerabilities. In 2015, DHL and Cisco Systems estimated there to be 15 billion connected objects globally. By 2020, it is anticipated that more than 50 billion internet-connected devices will be installed. As more data is collected and shared, significant efforts and resources will be required to address data security concerns raised by reliance on increasingly complex and interdependent systems.
Smart Cities and Transportation Systems Challenges and Opportunities

**Increased use of Big Data for planning:** Companies such as Google and Amazon are increasingly integrating Big Data into their businesses’ planning and marketing processes, allowing them to better market goods and services. Public agencies also have integrated Big Data into their management systems, in particular for preventive maintenance, incident detection, and engagement.46

**Limited funding for major capital projects:** Due to limited funding for new infrastructure, and a growing trend toward increasing sustainability, agencies are focusing on maximizing their existing investments and preserving the system through the use of technology and powerful data analytic tools. Investing in smart transportation systems may be a more effective, adaptable, and sustainable investment approach than capacity increasing projects.

**New role for public agencies in the collection and distribution of data:** The private market has and is expected to continue capturing and aggregating data from smartphones and telematics. Agencies are reconsidering their role as providers of transportation information, and are taking on new roles as data distributors and/or procurers,47 and as such, workforce development and capacity building are challenges that local agencies will need to address to yield the full benefits offered by advanced technology.

**Increased connectivity and data sharing:** The population of the U.S. sends out 2.6 million gigabytes of internet data per minute, and 90 percent of the data in the world was created in the last two years.48 Data-as-a-service companies provide services to customers in exchange for their customer’s data, and customers have and are expected to continue to agree to this exchange.

**Cybersecurity concerns:** Increased connectivity and data-sharing raises concerns about the security of private information and increases the risk of cybersecurity threats.

**Continued need for prioritization of smart infrastructure to achieve congestion and safety goals:** Smart infrastructure can route cars off of a freeway when there is an accident, or can implement congestion pricing or other pricing mechanisms that will be crucial to mitigating congestion externalities from AVs, additional freight delivery, and ridehailing services.

**Shift to network thinking demands inter-agency coordination:** Nationally, and in the San Diego region, the trend for all tools and systems is to shift from concentrating on isolated roadway systems to focusing on multi-modal performance management from a full transportation network perspective. This requires coordination and cooperation with agency partners.

**Regional consistency and collaboration is critical to the success of Smart Cities and Transportation:** Cooperation across systems and cooperation among managers and operators results in services that are seamless compared to the stove-piped systems of today, enhancing the effectiveness across the region, and the user experience and sharing resources and capabilities that heretofore were not possible.
**Policy Considerations**

While there is a great deal of uncertainty about how these technology trends will evolve, there is no doubt that they have the potential to provide great benefits for the San Diego region. However, there also are potential risks without proactive planning, policy interventions, and investment decisions that can guide the integration of technology and new mobility services toward an equitable and sustainable transportation future. The scenarios that follow frame the conversation by describing two possible approaches, and the respective outcomes for the future, followed by policy and investment considerations that can prepare the region to take advantage of the opportunities and minimize the unintended consequences of a passive approach.

<table>
<thead>
<tr>
<th>Seizing the Opportunity</th>
<th>A Passive Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared mobility services are integrated with public transit, moving more people with fewer cars. Mobility hubs are thriving and more people choose not to drive or own a car because shared mobility services, including public transit, are convenient, affordable, and comfortable. Vehicle automation allows commuters to make productive use of time that would have been spent driving.</td>
<td>Roadways become more congested due to an increase in private automobile trips. Automated vehicles are not connected or shared, increasing VMT with zero-occupancy vehicles on roadways between rides.</td>
</tr>
<tr>
<td>Vehicles are electric, autonomous, and connected, significantly improving safety while reducing congestion and GHG emissions. There is adequate public charging infrastructure to support shared electric fleets.</td>
<td>The lack of charging infrastructure prohibits the rapid expansion of electric vehicles, and inefficient AV fleets run on fossil fuels, increasing GHG emissions.</td>
</tr>
<tr>
<td>The region leverages the trend toward IoT and maximizes existing capital investments through implementation of Smart Cities, TSMO, and CV infrastructure, potentially reducing the need in the long term for capacity increasing capital projects.</td>
<td>Shared mobility services are not well-integrated, and compete with public transit; public transit is slow to adapt to technology trends and societal needs. This impacts ridership and fare box revenues, resulting in service reductions and difficulty supporting the transportation needs of low-mobility populations. Shared mobility services struggle to succeed, and become less affordable, less accessible, and less desirable.</td>
</tr>
</tbody>
</table>
Seizing the Opportunity

Telecommunications effectively reduces vehicle travel for work and personal trips. Although online shopping has increased, the delivery of goods and services is optimized in a connected and autonomous environment.

Autonomous fleets of shared mobility services enhance mobility for all, including seniors, low income, the disabled, and those without access to a privately-owned vehicle.

Complete streets projects become easier to implement with less right-of-way needed for cars. Roads are safer for pedestrians and cyclists, and shared mobility services have designated pick-up and drop-off zones. Less space being needed for parking allows more opportunities for productive uses, like housing.

Smart Cities infrastructure is widely deployed. Public services are data-driven, enhancing communities and enabling mobility to be consumed as a service through MaaS platforms that facilitate easy trip-planning, routing, and payment. Data generated from the transportation system and mobility services significantly improve transportation planning and decision-making.

A Passive Approach

Complete streets projects become more difficult to implement. Ridehailing vehicles double-park, blocking cyclists, endangering pedestrians, and creating bottlenecks. More space is required to accommodate cars and less space is available for housing, commercial uses, and public spaces.

The increase in online retail activity continues to generate inefficient goods movement activity, leading to freight-related congestion that impacts major corridors and local streets and roads.

Data infrastructure and management capabilities do not provide for connectivity between cars, infrastructure, and information systems; public services are not adapted. The lack of data-sharing hinders mobility hub effectiveness and limits data-driven planning, decision-making, and service delivery.

The San Diego region has been a leader in piloting and deploying innovative transportation services and infrastructure that leverage technology to improve the management of and to reduce the demand on the system. By continuing this legacy of action, the region can prepare for a transformative future where everyone benefits from improved mobility choices. The following policy and investment considerations are intended to help guide discussion by policymakers as they take steps toward shaping the future of mobility for the region.
Policy and Investment Considerations

Develop staff expertise, tools, and resources for data governance and management. Standardize data-sharing processes and promote open data policies across the region. Design and build data infrastructure so that new services can more easily integrate.

Develop a coordinated Smart Cities roadmap for the region that identifies high-priority transportation applications and accelerates their deployment through an implementation strategy that leverages existing regional services and planned infrastructure investments.

Invest in Smart Cities demonstration projects that enhance data management and sharing capabilities, and operational coordination across jurisdictional boundaries; consider new service delivery models that make more effective use of public resources, and that enable cities to adapt to their unique circumstances. Develop and prioritize projects that promote coordination and integration with traffic system management and operations and that enhance service delivery.

Invest in mobility hub demonstration projects and supportive policies that improve access for all, ensure equity, and promote safety across modes. Encourage and prioritize projects, (e.g., transportation system management and demand management, pedestrian, bicycle, and smart growth efforts) that support Mobility Hub implementation to promote integration with public transit and seamlessly connect people between shared modes.

Build upon current ITS strategic planning efforts and the San Diego Autonomous Vehicle Proving Ground to test and validate advanced traffic signal management systems, including accelerating the deployment of CV applications for fleet operations including public transit, emergency response, and freight operations.

Consider pricing mechanisms to increase system efficiency; support a shift toward shared modes of travel and thus reduce drive-alone trips and VMT.

Leverage the San Diego Regional Proving Ground as a test-bed for innovative pilots and public-private partnerships that support shared, electric, connected, and autonomous mobility, and Smart Cities initiatives. Foster innovation and mobility partnerships that provide the greatest public benefit.

Enhance regional modeling tools to better account for the impact of technology on transportation demand, congestion, system management, and access.

Develop technical resources and tools that support local government agencies with planning and preparing for technology and new mobility services. Encourage information sharing, coordination, and capacity building on Smart Cities initiatives through existing regional advisory bodies such as the San Diego Regional Engineers Council. Revisit and update existing toolboxes, policies, design guidelines, and resources, such as the Regional Complete Streets Policy and the Regional Parking Management Toolbox, to better integrate technology with new mobility services. Develop a Regional Smart Cities (Deployment) Toolbox with a focus on transportation infrastructure and applications.

Encourage unsolicited proposals and respond with procurements that incentivize the provision of equitable and accessible mobility services.
Look Ahead

As described in the previous sections, advances in ICT are revolutionizing how transportation is provided and managed. Although much ground was covered in this paper, other technologies on the horizon could dramatically impact both personal travel and goods movement in the future. While there is not sufficient data or research available on these technologies today, this section was developed to capture emerging technologies that could be considered in future updates of the Regional Plan.

Hyperloop

Hyperloop is a tube through which a pod could travel at very high speeds using electromagnets and vacuum technology. Routes have been proposed across the globe, including one between San Diego and Los Angeles, which would take less than 13 minutes. A number of start-ups are working on the development of the Hyperloop and are optimistic about its deployment, although skeptics think it is unsafe and cost-prohibitive.

3-D Printing

3-D printing is the process of making a solid object from a digital file autonomously. The logistics industry is set to be disrupted by this technology, which could reverse globalization trends and reduce the need for production far from distribution.

Augmented Reality

Potential applications of Augmented Reality (AR) in the transportation sector are numerous. AR currently is being used in connected and automated vehicle testing facilities, allowing for more specific scenario testing at a reduced cost. AR applications enhance the ability to provide education and healthcare from a remote location, and could be used as a travel-demand mitigation tool by reducing the need for travel to physical locations. Commercial applications in the retail industry also are on the horizon, allowing marketers to provide customers with a better understanding of their product before purchase.

Delivery Robots

Courier network services, such as GrubHub, Caviar, and Postmates, are researching ways to automate delivery through sidewalk robots. Companies such as Starship and Marble have developed prototypes, and some have been released on San Francisco streets, although they now are restricted to certain zones of the city.

Drones and Flying Cars

Drones are flying robots that use GPS and sensors to fly autonomously. While use-cases for drones vary widely, transportation and logistics companies, such as Amazon and Airbus, have taken interest in them as a way to transport goods. Airbus Helicopters is testing a drone parcel-delivery service on the campus of the National University of Singapore. While there are environmental gains from improved first/last mile and drayage delivery of goods, many question the appropriateness and safety of this delivery method.
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http://www.autonews.com/article/20171002/oem05/171009982/a-car-for-every-plug-and-purpose

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https://www.its.dot.gov/factsheets/dsrc_factsheet.htm

UC Berkeley Law and UCLA Law. Plugging Away: How to Boost EV Charging Infrastructure, June 2017:
https://www.law.berkeley.edu/wp-content/uploads/2017/06/Plugging-Away-June-2017.pdf (This was only statement I kept from original ETWP.)

https://www.transportation.gov/smartcity


San Diego Forward: The 2019-2050 Regional Plan
Draft Performance Measures
Regional Planning Committee Item 5 | February 2, 2018

2019 Regional Plan Development Process

- Fall 2017 / Early 2018
- Spring 2018
- Summer 2018
- Spring / Fall 2019

Network Development (All Modes)
- Define Unconstrained Network
- Update Transit Strategy
- Evaluate Technologies
- Evaluate Revenue Constrained Scenarios
- Revenue and Cost Projections
- Draft/Final RHNA

Applies Performance Measures
- Select Preferred Transportation Scenario
- Draft/Final 2019 RP/SCS, Air Quality Conformity, and EIR

Ongoing Public Involvement
Vision and Goals

To facilitate the efficient movement of people and goods to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.

Network Selection Informed by Performance Measures

Network #1

Network #2

Network #3

Performance measures

Board selects preferred revenue constrained Scenario
What Are Performance Measures?

- Help explain how the transportation system would work when the projects in the Regional Plan are built
  - Quantitative metrics
  - Metrics that can be projected for future years of the Regional Plan

Outreach

- SANDAG working groups
- Independent Taxpayer Oversight Committee
- Community Based Organizations
- Public workshop
- Online survey
Comments Received

• Innovative Mobility and Planning
  – Travel time/delay
  – Mode share
  – Safety
  – Vehicle miles traveled
• Vibrant Economy
  – Regional economy
  – Goods movement
  – Cost of transportation
• Healthy Communities and Environment
  – Access
  – Equity
  – Climate change
  – Public health

Peer Review Panel

• Six panelists from academia, Federal Highway Administration, Metropolitan Planning Organizations, and private sector
• Recommendations
  – Include fewer metrics supported by quality data
  – Create distinct network scenarios
  – Simplify graphics and text to convey performance measure results
1. Is delay reduced?
   1a. Daily vehicle delay per capita (minutes)

2. Are more people walking, biking, using transit, and sharing rides?
   2a. Percent of trips by walk, bike, transit, and carpool (work and all trips)
   2b. Vehicle miles traveled (per capita and regionwide)
3. Is the transportation system safer?
   3a. Vehicular fatalities and serious injuries per capita
   3b. Non-motorized fatalities and non-motorized serious injuries

4. Do the transportation investments help to improve the regional economy?
   4a. Benefit/cost ratio of transportation investments
5. Does the transportation network support smart growth?

5a. Percentage of population/employment within 0.5 mile of high frequency transit stops

5b. Percentage of population/employment within 0.25 mile of a bike facility (class I and II, cycletrack, and bike boulevard)

6. How does the transportation network support public health?

6a. Time engaged in transportation-related physical activity per capita (minutes)
7. Is access to jobs and key destinations improving for all communities?*

7a. Percent of population within 30 minutes of jobs and higher education (via driving and transit)

7b. Percent of population within 15 minutes of goods and services (retail, medical, parks, and beaches) (via driving and transit)

* Total population, disadvantaged communities (seniors, low-income, and minority), and non-disadvantaged communities

8. Are greenhouse gas emissions reduced?

8a. On-road CO2 emissions (pounds/day) per capita and regionwide
Additional Performance Measures

- Average peak-period travel time to work (drive alone, carpool, transit, bike, and walk) (minutes)
- Average travel times (minutes)
  - to/from tribal lands
  - to/from Mexico
  - to/from neighboring counties (Imperial, Orange, and Riverside)
  - to/from military bases/installations
- Change in percent of income consumed by transportation costs
- Percentage of population/employment within 0.5 mile of a transit stop
- Percent of population engaging in more than 20 minutes of daily transportation related physical activity

Next Steps

- Revised draft performance measures
  - March 2, 2018: Recommendation by Transportation Committee and Regional Planning Committee
  - March 23, 2018: Approval by Board of Directors
- Spring/summer 2018: Apply performance measures to 2019 Regional Plan transportation network scenarios
- Fall 2018: Select draft 2019 Regional Plan preferred network scenario
2019 Regional Plan Development Process

- **Fall 2017 / Early 2018**
  - Network Development (All Modes)
    - Define Unconstrained Network
    - Update Transit Strategy
    - Evaluate Technologies

- **Spring 2018**
  - Revenue Constrained Scenarios
  - Evaluate Revenue Constrained Scenarios
  - Select Preferred Transportation Scenario

- **Summer 2018**
  - Ongoing Public Involvement
  - Revenue and Cost Projections
  - Draft/Final RHNA

- **Spring / Fall 2019**
  - Draft/Final 2019 RPS/CCL, Air Quality Conformity, and EIR
  - Vision, Goals, and Policy Objectives
  - 2050 Regional Growth Forecast
Adoption Rate of New Technology

Technology Adoption in the U.S.

White Paper Contents

- Technology and societal trends impacting transportation
  - Mobility as a Service (MaaS)
  - Zero emission, autonomous, and connected vehicles
  - Smart Cities and transportation systems
- Policy considerations
- Look ahead
Growth in the Internet of Things
The number of connected devices will exceed 50 billion by 2020

Mobility as a Service

Regional Planning Committee Item 4
February 2, 2018
On-Demand Rideshare

Ridesharing has expanded rapidly within the U.S. — Uber and Lyft are now available in 731 cities compared to 37 in 2012. Dynamic carpooling options are also on the rise in California.

<table>
<thead>
<tr>
<th>54.8 million</th>
<th>6 billion</th>
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<tbody>
<tr>
<td>total global users</td>
<td>vehicle miles traveled in U.S.</td>
</tr>
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</table>

**Rapid growth in rides**
For every rides taken in 2014, about 35 trips are being taken in 2017.

**Dynamic carpooling**
Launched in the San Francisco Bay Area, Waze Carpool and Scoop are two carpool apps available throughout California. The number of Bay Area Scoop users has increased ten-fold in the last year, and approximately 3.5 million carpools were taken since 2015.

Bay Area Scoop users
- April 2016: 10,000 users
- November 2017: 100,000 users

Bikeshare

Popularity has increased from bike share stations in 6 countries in 2000 to 82 countries in 2017. Today, more than 1.1 million bikes are active in global programs.

**In the U.S.**
- 119 bikeshare systems in 2017
- 42,000 bike share docks in bike share stations in 2014
- 88 million bicycle trips taken from 2010 to 2016

Bikeshare systems
In January 2017, an estimated 4,786 bikeshare stations could be found across the country, with a growing number of dockless bikes.

77% of bikeshare stations in the U.S. are within one block of transit.
Vehicle Technologies
Electric and Zero-Emissions Vehicles

What are Autonomous Vehicles?

Drivers or self-driving cars are computer driven and do not require a human to safely operate the vehicle. Sensors collect data about nearby objects that are seen and provide input to the vehicle’s computer. These sensors include lidar, radar, and cameras to determine how the vehicle should react. They have the potential to improve safety and mobility and to reduce travel times and roadway congestion.

- **Camera**: Detects objects moving on the road ahead and other objects that are color specific (blue, red, or yellow for traffic lights).
- **Sensor**: Detects objects and infrastructure that are near and far.
- **GPS**: Global Positioning System provides the vehicle’s location.
- **Computer**: Processes and identifies data and decides how to react.
- **Sensor**: Identifies objects and infrastructure to avoid accidents.
**Regional Planning Committee Item 4**

**February 2, 2018**

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**What are Connected Vehicles?**

In-vehicle and wireless technology enables connected vehicle (CV) communication:

- **Vehicle to vehicle (V2V)**
- **Vehicle to infrastructure (V2I)**
- **Vehicle to everything (V2X)**

CVs give the car and driver advanced information and warnings to inform safer driving decisions, such as when a car ahead brakes suddenly or if there is an accident that causes traffic to slow or merge. CVs can share data about the vehicle with the driver ten times per second, as well as if there was stopping due to weather on the road. These wireless communications are shared between vehicles (V2V) to improve road safety.

CVs can receive notifications from vulnerable road users (V2R) – like pedestrians, bike riders, and road workers – to assist drivers to use caution.

CVs can communicate with traffic control infrastructure (V2I) like traffic signals, ramp meters, toll and parking payment systems, which could improve traffic flow and reduce emissions.

The National Highway Traffic Administration reports that, when fully deployed, CVs could address 80% of automobile crashes.

**Multimodal Connectivity**

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**2019 Regional Plan**
Smart Cities and Transportation Systems

What makes up a smart city?

Energy
Efficiency in the consumption of energy to power our homes.

Transport
Reduction in traffic congestion through improved public transit and carpooling.

Homes
Smart home systems that optimize energy use and security.

Public Service
Digital tools and services for efficient and effective public communication.

Health
The use of ICT to enhance people's access to healthcare services.

Regional Planning Committee Item 4  
February 2, 2018

2019 Regional Plan

Partnership between Caltrans, SANDAG, NHTSA, UC Berkeley, and Carnegie Mellon

Demonstration of autonomous technology on the I-15 Express Lanes

National Automated Highway System Demo 1997
Opportunities and Challenges

- **Mobility as a Service**
  - Mode shift and pooled trips
  - Decreased vehicle ownership
  - Social equity
  - Public-private partnerships

- **Vehicle technologies**
  - Infrastructure changes
  - Safety and mobility
  - Vehicle miles traveled
  - Roadway design

- **Smart Cities and transportation systems**
  - Limited funding
  - Smart infrastructure
  - Inter-agency coordination

Policy Considerations

- Accounting for the impact of technology on transportation demand, system operations, and access
- Promote coordination and integration for service delivery
- Consider mobility hub implementation with capital and program investments
- Leverage the San Diego Regional Proving Grounds
- Consider pricing mechanisms to increase efficiency and reduce vehicle miles traveled
Next Steps

- Board to receive information about emerging technologies in February 2018
- Policy Committees and Board to begin developing the revenue constrained transportation scenarios with a consideration of emerging technologies and other areas