



California Transit
Association

GHG-Reducing Transit Strategies: Cap & Trade

Joshua W. Shaw

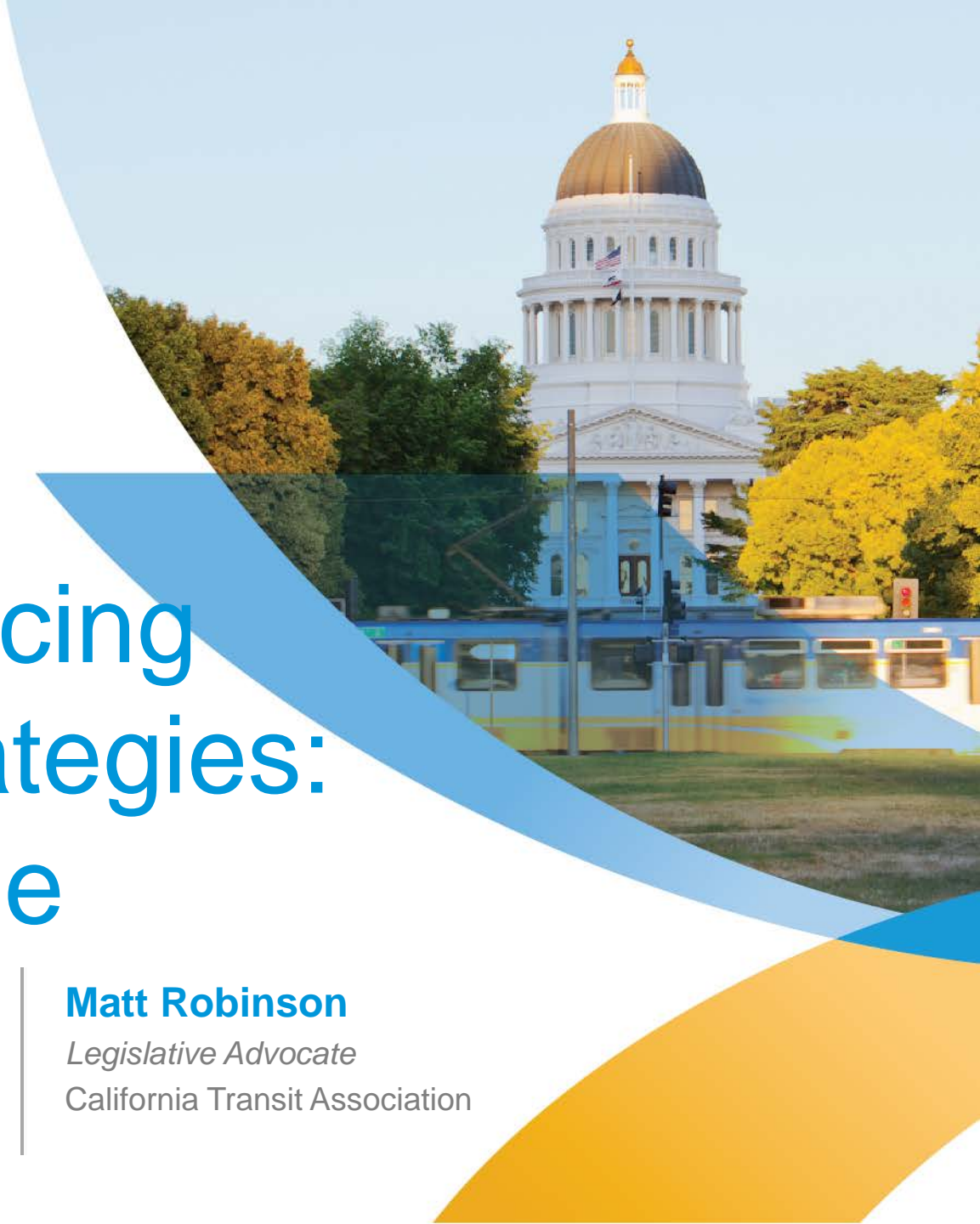
Executive Director

California Transit Association

Matt Robinson

Legislative Advocate

California Transit Association



Webinar overview

- Summary of major transit funding programs
- Technical assistance on 2014-15 programs
- Update on efforts to influence 2015-16 and beyond
 - Obtain your feedback
- Feature work of ICF International



Cap and Trade overview



Cap and Trade Program Development Matrix

Program	Responsible Agencies	Initial Public Workshops	Draft Guidelines Released	Draft Guidelines Workshops	Final Guidelines Approved	Project Solicitation Released	Application Deadline	Projects Awarded
Affordable Housing and Sustainable Communities	Strategic Growth Council Housing and Community Development Dept. California Natural Resources Agency	August 2014	September 2014	October 2014	January 2015	January 2015	April 2015	June 2015
Transit and Intercity Rail Capital Program	California State Transportation Agency California Transportation Commission	August 2014	December 2015	December 2015 January 2015	February 2015	February 2015	April 2015	August 2015
Low-Carbon Transit Operations Program	California State Transportation Agency Caltrans Air Resources Board	August 2014	November 2014	November 2014 December 2014	December 2015	December 2015	February 2015 April 2015	April 2015 June 2015
Disadvantaged Communities	California Environmental Protection Agency Air Resources Board	N/A	August 2014	August 2014 September 2014	September 2014	N/A	N/A	N/A

Prepared by California Transit Association staff:
This document reflects official/published dates

Activity Occurred Already

N/A = Not Applicable to this program or guidelines

LCTOP

- Program is underway:
 - Similar to PTMISEA
 - SCO released STA shares in late November
 - Two funding cycles in 2014-15 (February 2 and April 15)
- Eligible project types:
 - Expand transit service
 - Low-carbon transportation projects that support new/expanded transit service
 - Active transportation projects that support new/expanded transit service
 - Enhancement projects
- GHG emission reductions determined to occur if project falls in to one of the eligible project categories

Pages 12-13

LCTOP

<http://www.dot.ca.gov/hq/MassTrans/lctop.html>

TIRCP

- Program is in the works:
 - Draft guidelines out until end of January
 - Workshops on January 20 (LA) and 21 (Sacramento)
 - Likely to be two-year program at first (\$125 million)
- Eligible projects types:
 - Rail capital projects (including rolling stock)
 - Rail operational improvements
 - Rail integration
 - Bus rapid transit and bus transit?
 - Objectives and Evaluation Criteria seem to preclude bus
- GHG reduction quantification method still in development at ARB



TIRCP

<http://www.dot.ca.gov/hq/MassTrans/tircp.html>

AHSC

- Program finalized next week:
 - Final draft guidelines out for 6 more days
 - SGC votes on January 20
- Eligible project types:
 - Transit Oriented Development
 - Affordable Housing + Capital Use (Transportation)
 - ½ - mile of transit station/stop served by HQTS
 - HQTS = high-quality transit service (15-minutes/ROW)
 - Integrated Connectivity Project
 - No HQTS serving area
 - Capital Use + Program/Planning Use
 - Include transit station/stop
- GHG reductions quantified using CalEEMod/CMAQ models

AHSC

http://sgc.ca.gov/s_ahscprogram.php

Questions?

- Any questions about the 2014-15 programs?
 - AHSC
 - LCTOP
 - TIRCP



2014-15 vs. 2015-16+++

- That was program's as they ARE developing
- 2014-15 program guidelines are “interim”
- We will CONTINUE to advocate for improvements, for 2015-16+
- Association engaged ICF International to provide technical guidance



Assessing Greenhouse Gas Impacts of Transit

Webinar for California Transit Association Members



January 14, 2014



Introduction

Project overview

Goal: to recommend a method for assessing the GHG impacts of transit projects when applying for and awarding Cap and Trade Funds.

Deliverables:

- Task 1: Identify transit agency GHG reduction strategies
- Task 2: Recommend GHG quantification methodologies
- Task 3: Recommend overall quantification approach

Today's webinar will summarize our work to date.



Caltrans, CA Interregional Blueprint

How is the state going to assess GHG reductions?

Program	Lead Agency	Amount	GHG Guidance Issued to Date
Low Carbon Transit Operations Program	CalSTA	\$25m	Interim list of GHG-reducing projects
Transit and Intercity Rail Capital Program	Caltrans / CTC	\$25m	None
Affordable Housing and Sustainable Communities Program	SGC	\$130m	Interim guidance draws on recommended quantification tools (CalEEMod and CMAQ project assessment criteria)

- Everyone is waiting on ARB to issue final guidance for 2015-16
- ARB understands challenges with creating quantitative guidance and is interested in transit agency feedback

The LCTOP guidelines include four categories of projects

- Expand transit service (BRT, increase service and capacity)
- Low carbon transportation projects that support new/expanded transit services (zero-emission vehicles, renewable energy at facilities)
- Active transportation projects that support new/expanded transit services (bike/ped paths, bicycle racks and storage, covered benches)
- Enhancement projects (vehicle fuel efficiency, free or reduced fare passes and vouchers)

The LCTOP guidelines don't address all projects

There are several GHG-reducing projects that we looked at that are not explicitly named under the LCTOP guidelines or do not fit neatly into the four categories:

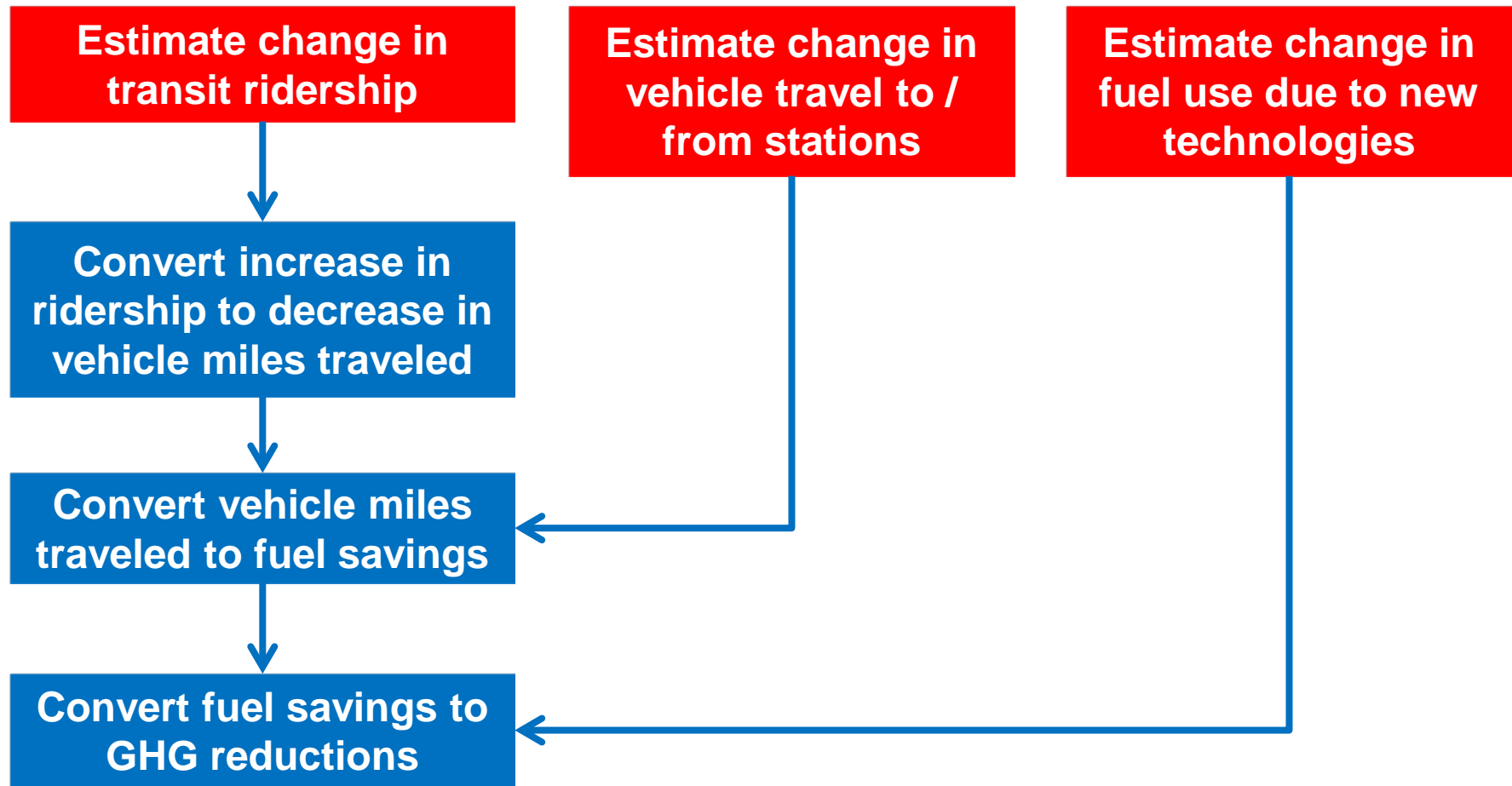
- Projects that improve travel speeds or reliability (other than BRT)
- Demand management, incentive, and outreach programs
- Carsharing at transit stations
- Transit-oriented development (this is a focus of the AHSC)
- Efficiency improvements to non-transit vehicles or equipment
- Energy-efficient maintenance or administrative facilities

Tools recommended by AHSC have their pros / cons

Tool	Pros	Cons
CalEEMod	<ul style="list-style-type: none">▪ Relatively easy to use▪ Aligns with what we recommend for TOD projects	<ul style="list-style-type: none">▪ Focused on land use projects, not transit projects▪ Assesses a lot of other impacts in addition to GHGs; challenging to navigate
CMAQ Criteria	<ul style="list-style-type: none">▪ Focused on transportation projects	<ul style="list-style-type: none">▪ Word document; not as easy to use▪ Captures a limited group of transit projects (new service, vanpools/shuttles, ped facilities)▪ Dated (May 2005)

We'd like to see a tool that combines the ease of use of CalEEMod with the transit focus of the CMAQ criteria.

APTA GHG Protocol answers the easy questions



Once you **estimate the impact of your project on travel behavior or fuel use**, APTA can help you **convert the results to GHG emissions**... but the **first step** is the more challenging one.

Four categories of GHG reduction strategies

Category	Project types
Expanding or Improving Transit Capacity	<ul style="list-style-type: none">▪ Increase capacity of existing service▪ Increase service frequency▪ Enhance travel speeds and reliability▪ Extend operating hours▪ Route expansion
Transit Rider Outreach and Incentives	<ul style="list-style-type: none">▪ Transportation demand management programs▪ Improvements to transit customer experience▪ Network/fare integration
Active Transportation and Land Use	<ul style="list-style-type: none">▪ Transit oriented development▪ Bicycle and pedestrian connections to transit▪ Carshare at transit stations
Improving the Efficiency of Transit Energy Use	<ul style="list-style-type: none">▪ Bus and railcar retrofits▪ Rail electrification▪ Non-transit vehicle improvements▪ Deploy more efficient transit vehicles▪ Renewable energy projects▪ Facility energy efficiency improvements

3 approaches for demonstrating GHG reductions

- **Simple calculation:** For strategies that are well-covered by existing research and tools, we outline a simple, straightforward method to quantify GHG reductions.
- **Qualitative criteria:** For strategies where there is insufficient research to quantify GHG reductions, or where research shows a small impact on emissions, we list criteria for qualitatively demonstrating GHG reductions.
- **Complex analysis:** For strategies that require more complex analysis, we recommend tools and methods to assess GHG benefits.

There are simple ways to quantify the GHG reductions from many of the strategies that we've looked at. But:

- How likely are agencies to pursue the strategies that are more complex to quantify, and do they need more help?
- Are qualitative criteria going to be enough to make the case for a project?

What we'd like to see

- State and transit agencies collaborate to create quantification guidance, following our recommendations.
- State issues guidance and associated spreadsheet tool
- Transit agencies can quantify strategies:
 - Using state guidance/tool—low LOE.
 - Using advanced methods—higher LOE to analyze/document.
- State reviews results

...But we intend for the work that we've done to be useful to transit agencies in quantifying GHG reductions as long as the state lands on an approach that allows any flexibility.

Presentation outline

- For each of the four categories of strategies, we will discuss:
 - Example projects
 - *Our recommended method* for analyzing GHG reductions (simple quantification, qualitative criteria, or complex analysis)
 - What data, tools, or criteria are applicable under our recommended method (more detail is available in memos)
 - Whether project is considered GHG-reducing by draft LCTOP guidelines
 - Opportunities and challenges
- I will pause frequently for questions.



Questions?



Expanding or Improving Transit Capacity

Expanding or improving transit capacity: Project types

Project Category	Example Project Types
Increase capacity of existing service	<ul style="list-style-type: none">■ Purchase higher capacity/longer vehicles■ Expand vehicle fleet and maintenance facilities■ Expand vertical circulation elements at stations/station expansion to increase passenger throughput capacity■ 2nd or 3rd track
Increase service frequency	<ul style="list-style-type: none">■ Additional buses or trains put into service■ Modernize train control system■ Expand vehicle fleet and maintenance facilities
Enhance travel speeds and reliability	<ul style="list-style-type: none">■ Upgrades to right of way■ Exclusive bus right of way■ Bus rapid transit (BRT)■ Level boarding for buses■ Bus signal priority system
Extend operating hours	<ul style="list-style-type: none">■ Late night or early morning transit service
Route expansion	<ul style="list-style-type: none">■ Extend bus or train lines into unserved areas

Transit capacity: Analyzing GHG reductions

Project category	Recommended approach	Applicable data, tools, or criteria	Meets LCTOP Criteria?
Increase capacity of existing service	Qualitative criteria	<ul style="list-style-type: none"> Project serves SCS high-growth areas The service is or will soon be at capacity Project uses low emissions vehicles 	Yes
Increase service frequency	Simple calculation	<ul style="list-style-type: none"> % change in headways Current ridership Mode shift factor 	Yes
Enhance travel speeds and reliability	<ul style="list-style-type: none"> Simple calculation (speeds) Qualitative (reliability) 	<ul style="list-style-type: none"> % change in travel times Current ridership Mode shift factor 	Only for BRT projects
Extend operating hours	Qualitative criteria	<ul style="list-style-type: none"> Project serves SCS high-growth areas Project uses low emissions vehicles 	Yes
Route expansion	Complex analysis	<ul style="list-style-type: none"> Travel model, ridership forecasts, or EIR 	Yes

Transit capacity: Opportunities and challenges

Opportunities

- There is a rich body of research on how speed and frequency affect transit
- New and extended routes are challenging to quantify, but agencies are likely to already have done some analysis

Challenges

- How can agencies analyze projects that increase speed, frequency, and capacity simultaneously?
- Can we rely on MPOs to quantify the GHG impacts of capital projects through the SCS?
- Can agencies make a case for maintaining current capacity?



Questions?

STER SO

Next Silver Line
Arriving



Transit Rider Outreach and Incentives

Transit rider outreach and incentives: Project types

Project Category	Example Project Types
Transportation demand management programs	<ul style="list-style-type: none">■ Discounted transit passes■ Transit vouchers■ Bike to transit incentives■ Vanpool subsidies■ Transit encouragement programs
Improvements to transit customer experience	<ul style="list-style-type: none">■ Traveler information system/real time arrival information■ New/upgraded bus shelters
Network/fare integration	<ul style="list-style-type: none">■ Integrated ticketing across systems

Transit rider outreach: Analyzing GHG reductions

Project category	Recommended approach	Applicable data, tools, or criteria	Meets LCTOP Criteria?
TDM programs that involve discounted fares or vouchers	Simple calculation	<ul style="list-style-type: none"> ▪ % change in fares ▪ % of population eligible for incentives ▪ Total system PMT ▪ Mode shift factor 	No
Other TDM programs	Qualitative criteria	<ul style="list-style-type: none"> ▪ Project serves SCS high-growth areas ▪ Project implemented alongside capacity-increasing projects 	No
Improvements to transit customer experience	Qualitative criteria	<ul style="list-style-type: none"> ▪ Project serves SCS high-growth areas ▪ Project implemented alongside capacity-increasing projects 	No
Network/fare integration	Qualitative criteria	<ul style="list-style-type: none"> ▪ Project serves SCS high-growth areas ▪ Project implemented alongside capacity-increasing projects 	Yes

Transit rider outreach: Opportunities and challenges

Opportunities

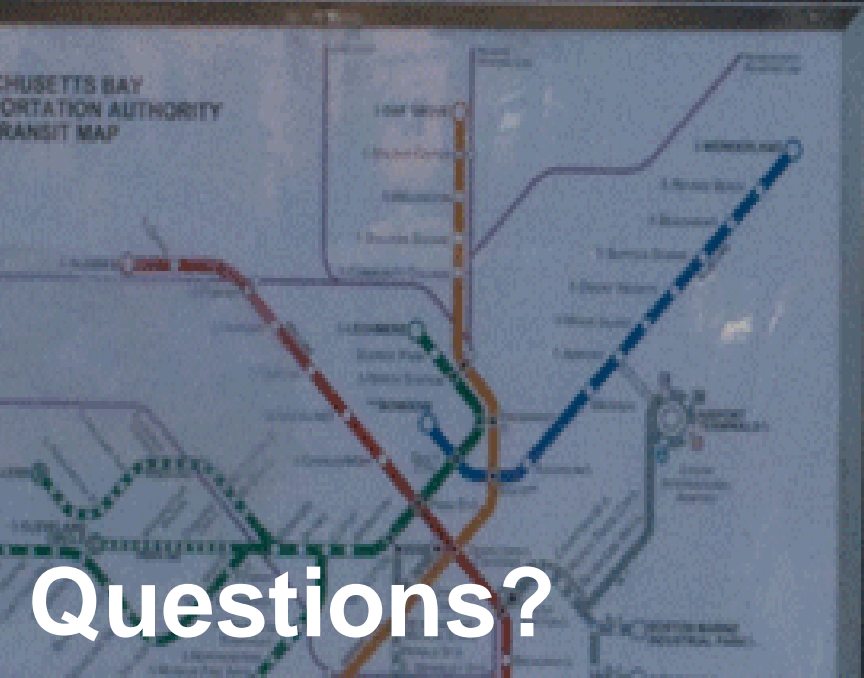
- There is a rich body of research on the price of transit and its impact on ridership

Challenges

- Other projects in this category are challenging to quantify, and comparison projects are challenging to find
- What research there is often shows little impact

STER SO

Next Silver Line
Arriving



Questions?

Active Transportation and Land Use



Active transportation and land use: Project types

Project Category	Example Project Types
Transit oriented development	<ul style="list-style-type: none">■ Joint development project on transit-agency owned property
Bicycle and pedestrian connections to transit	<ul style="list-style-type: none">■ Bike/ped paths■ Bike share at transit stations■ Bicycle parking at transit stations■ Bike racks on buses/trains
Carshare at transit stations	<ul style="list-style-type: none">■ Provide carshare parking at transit stations or other incentives

Bike/ped and TOD: Analyzing GHG reductions

Project category	Recommended approach	Applicable data, tools, or criteria	Meets LCTOP Criteria?
Transit oriented development	Simple quantification	<ul style="list-style-type: none"> Density, land use diversity distance to downtown, and/or distance to nearest transit station for proposed development See CAPCOA Handbook for additional guidance 	No (but it is a focus of the AHSC)
Bicycle and pedestrian connections to transit	Qualitative criteria	<ul style="list-style-type: none"> Project is located at a station area where service will be improved Project is located in an area with high levels of walking/biking Project connects new development called for in the SCS to transit 	Yes
Carshare at transit stations	Qualitative criteria	<ul style="list-style-type: none"> Any carshare pod at a high-quality transit station is likely to contribute to reducing GHG emissions 	No

Bike/ped and TOD: Opportunities and challenges

Opportunities

- There is an extensive body of research on the GHG impact of TOD projects, and state/regional governments have made quantification tools available (CalEEMod, BAAQMD TDM tool).
- Emerging research on bike/ped facilities at stations may make it easier to quantify some active transportation strategies in the future.

Challenges

- It may be challenging for transit agencies to claim responsibility for GHG reductions due to TOD projects.
- Most active transportation strategies are challenging to quantify and do not have a big impact on GHG emissions.

Questions?





Improving the Efficiency of Transit Energy Use

Transit energy efficiency: Project types

Project Category	Example Project Types
Bus and railcar retrofits to improve fuel efficiency	<ul style="list-style-type: none">■ LED lighting on buses and trains■ Anti-idling systems for diesel trains■ Regenerative braking for trains
Rail electrification	<ul style="list-style-type: none">■ Convert diesel trains to electricity
Non-transit-vehicle improvements	<ul style="list-style-type: none">■ Charging stations for EVs at transit stations■ Hybrid support vehicles
Deploy hybrid, alternative fuel, or more efficient transit vehicles	<ul style="list-style-type: none">■ Conversion of on-demand shuttles to electric vehicles■ Conversion of fixed-route fleet to CNG■ CNG refueling stations■ Hybrid / electric buses
Renewable energy projects	<ul style="list-style-type: none">■ Solar power at facilities and stations■ Wind power in right of way
Facility energy efficiency improvements	<ul style="list-style-type: none">■ More efficient lighting / HVAC■ Reduce energy use from computers and other electronics■ Certify facility under LEED standard

Transit energy efficiency: Analyzing GHG reductions

Project category	Recommended approach	Applicable data, tools, or criteria	Meets LCTOP Criteria?
Bus and railcar retrofits to improve fuel efficiency	Simple calculation	<ul style="list-style-type: none"> Annual VMT New fuel economy Baseline fuel economy 	Yes
Rail electrification	Simple calculation	<ul style="list-style-type: none"> Annual VMT New/baseline fuel economy New/baseline fuel emissions factor 	Yes
Non-transit vehicle improvements	Simple calculation	<ul style="list-style-type: none"> Annual VMT New/baseline fuel economy New/baseline fuel emissions factor 	No
Deploy hybrid, alternative fuel, more efficient transit vehicles	Simple calculation	<ul style="list-style-type: none"> Annual VMT New/baseline fuel economy New/baseline fuel emissions factor 	Yes
Renewable energy projects	Simple calculation	<ul style="list-style-type: none"> Annual energy generation Electricity emissions factor 	Yes
Facility energy efficiency improvements	Complex analysis (for most strategies)	Strategies vary widely, and it requires custom analysis to estimate energy savings	No

Transit energy efficiency: Opportunities and challenges

Opportunities

- This is the area best covered by existing guidance and tools.
- It is generally easier to get the operational data that is needed to quantify these strategies than to estimate impacts on travel behavior.

Challenges

- Strategies are so varied that it's hard to craft a uniform quantification approach.
- New technologies are always emerging.



Questions?

Outstanding questions

- Did we miss any important GHG-reducing projects that your agency is considering?
- How, if at all, should agencies quantify the GHG benefits of maintaining current service?
- How receptive is your agency likely to be to using a GHG quantification methodology recommended by the state?
- How likely is your agency to want to use more complex analytical tools and techniques to fully capture GHG reductions?
- What should be the process for reviewing projects where transit agencies estimate GHG reductions using their own data / methods?



California Transit
Association

GHG-Reducing Transit Strategies: Cap & Trade

Joshua W. Shaw

Executive Director

California Transit Association

Matt Robinson

Legislative Advocate

California Transit Association

