



County of San Diego



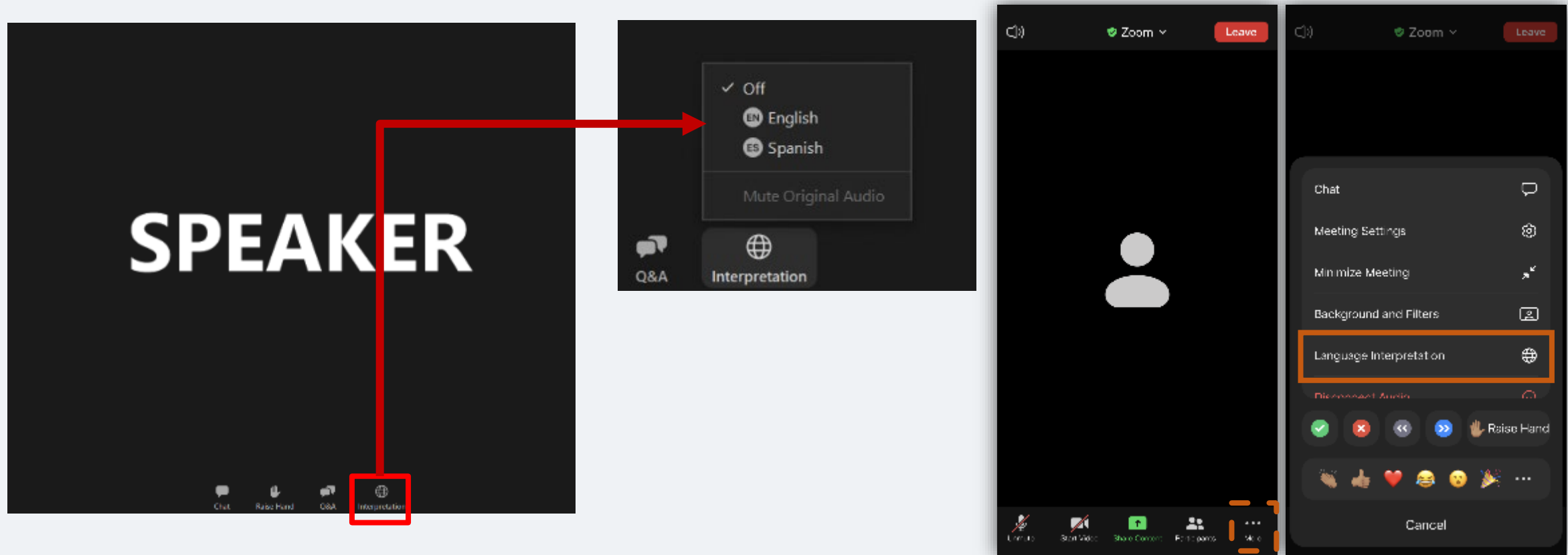
GETTING TO  
**ZERO**

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

# Transportation Working Group

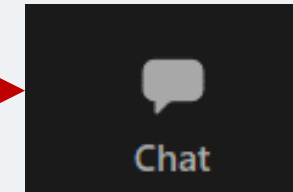
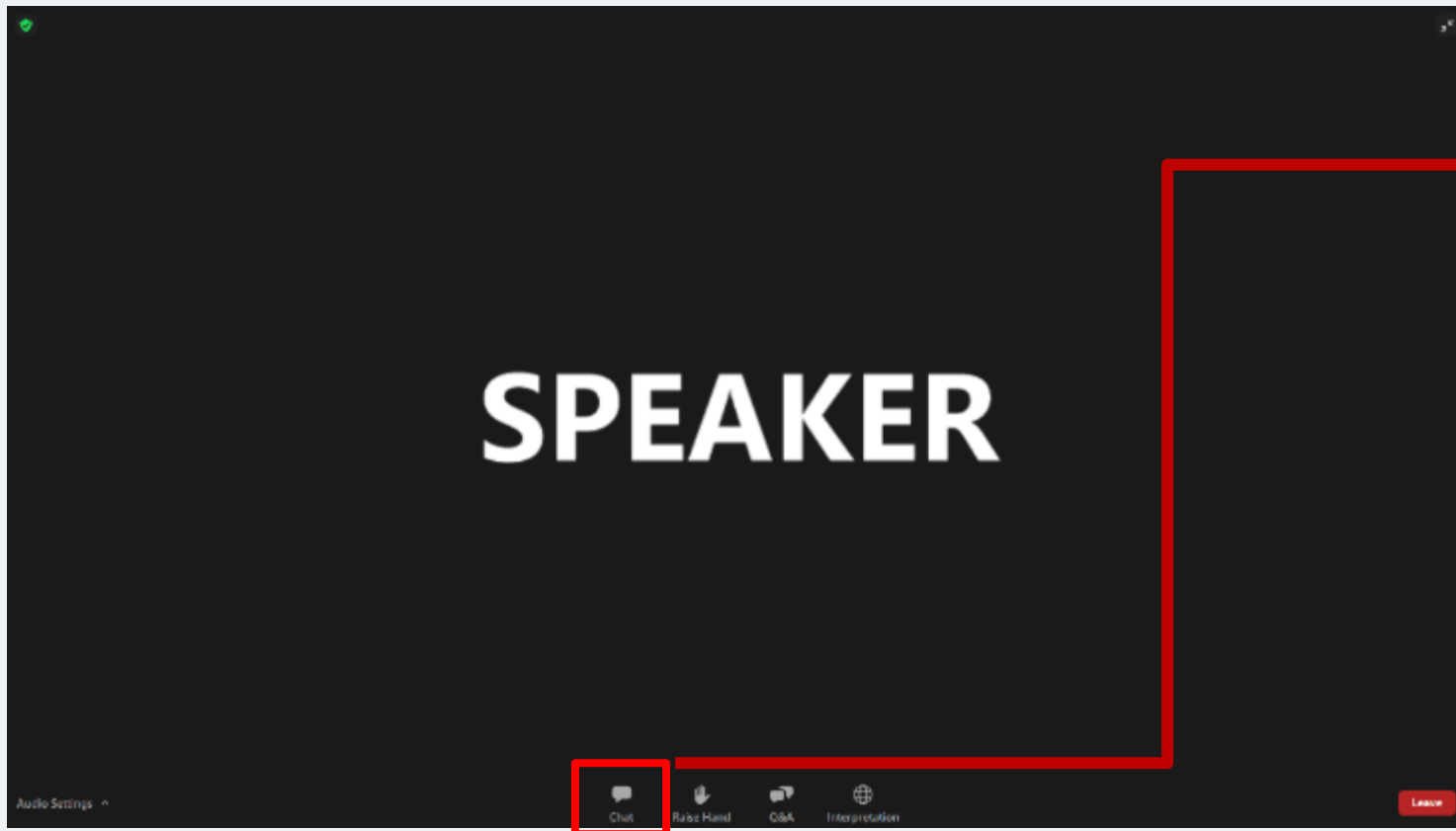
October 27, 2022

# How to use Zoom // *Cómo Usar Zoom*



Please select your language of choice (you must select one option)  
*Debe seleccionar el idioma de su preferencia (Tiene que escoger un idioma)*

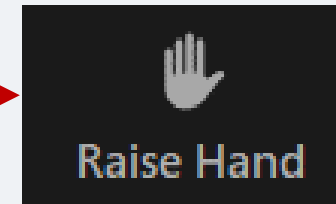
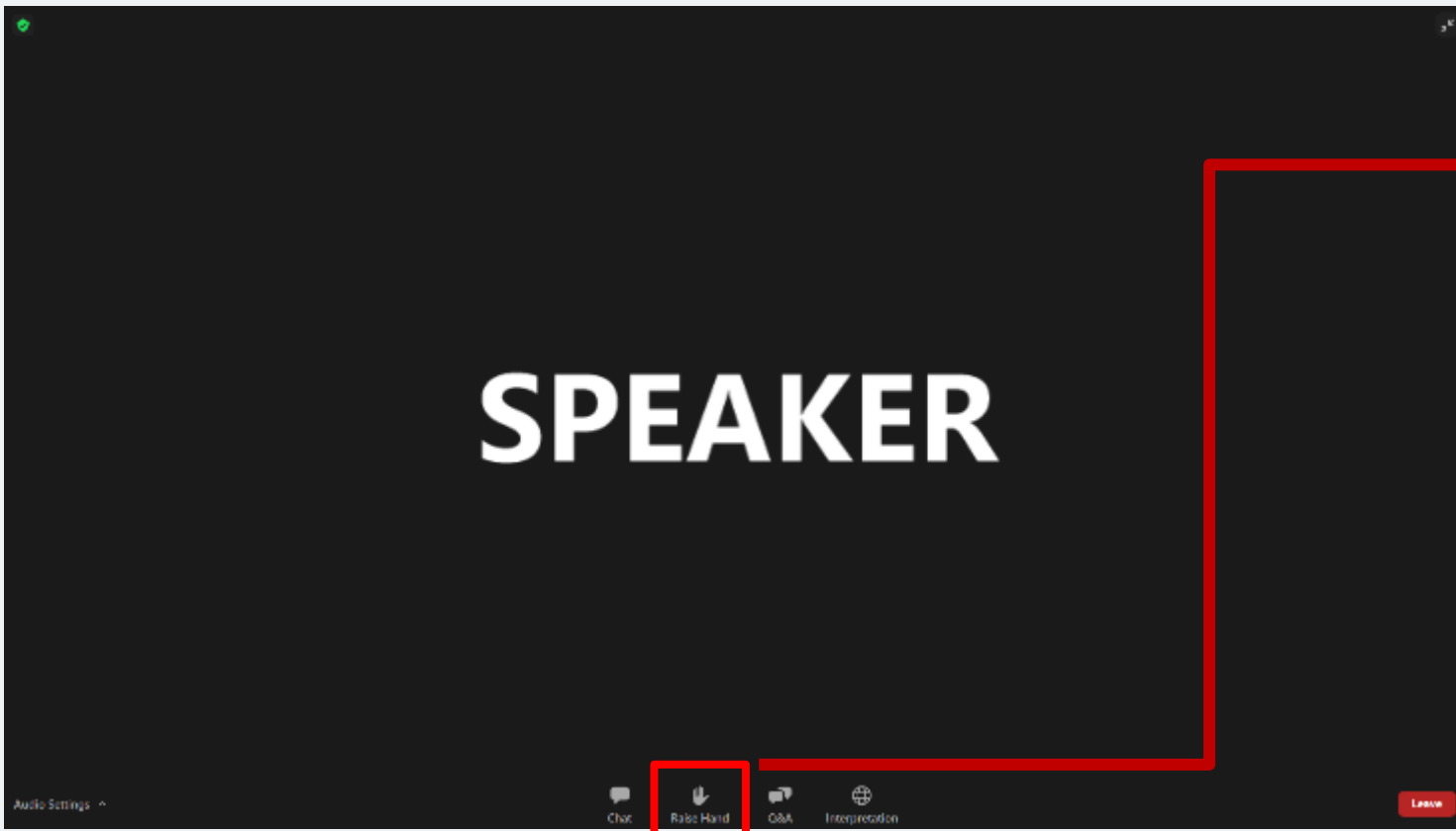
# How to use Zoom // *Cómo Usar Zoom*



Comments and questions can be submitted through the chat window.

*Los comentarios y las preguntas se pueden enviar a través de la ventana de chat.*

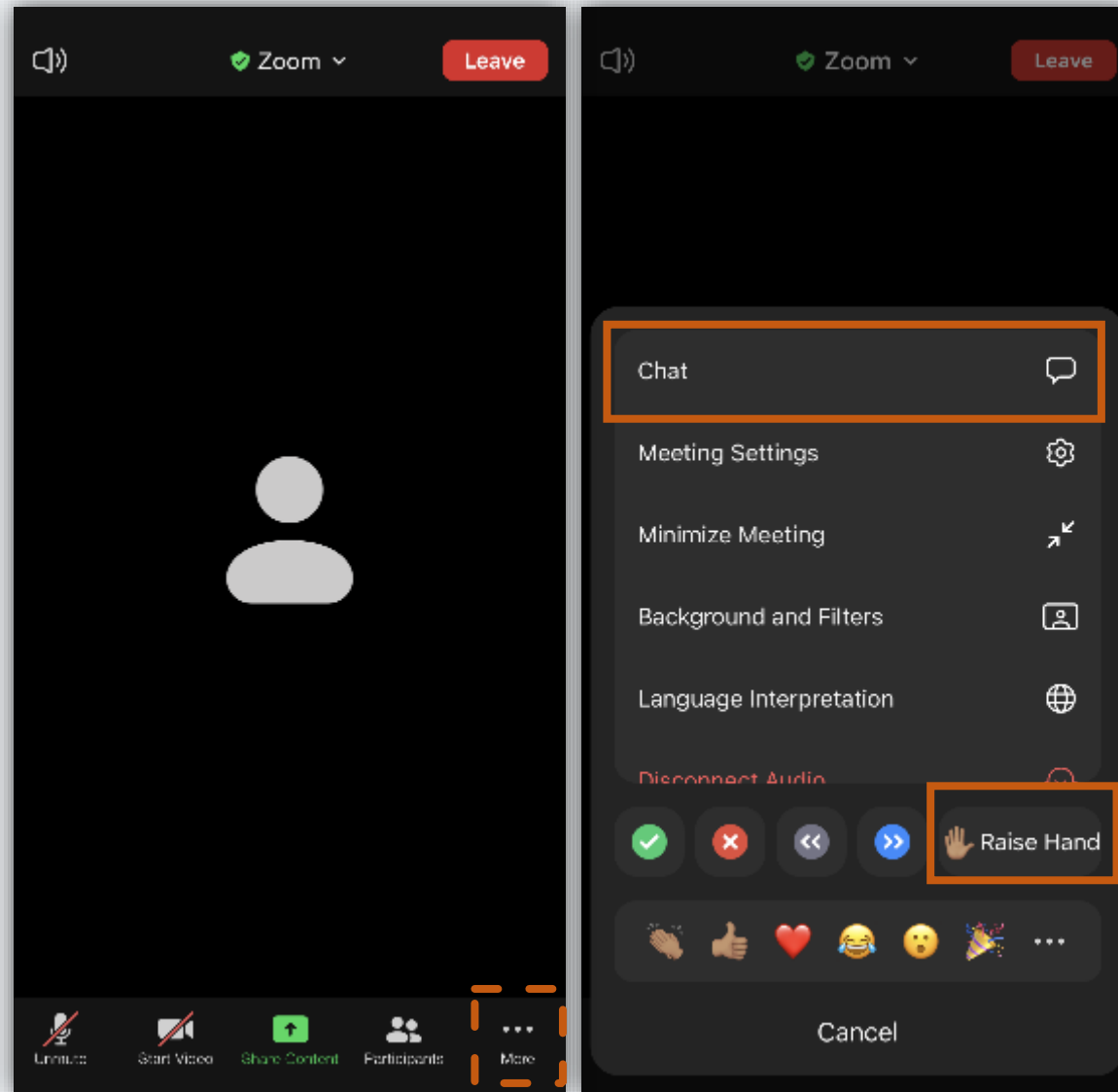
# How to use Zoom // *Cómo Usar Zoom*



During the discussion, if you would like to speak over the audio, please raise your hand (otherwise questions and comments can be submitted through the Chat window)

*Durante el debate, si desea participar de manera oral, por favor, levante la mano (de lo contrario, las preguntas y comentarios pueden presentarse a través de la ventana de Chat)*

# On your Phone // *En su teléfono móvil*





# Role of Working Groups



# Today's Agenda

---

- Welcome
- Stakeholder Presentations
  - Dr. Nilmini Silva-Send, Energy Policy Initiatives Center at University of San Diego School of Law and Facilitator Questions
  - Jim Misener, Qualcomm and Facilitator Questions
  - Kyle Heiskala, Environmental Health Coalition and Facilitator Questions
- Implementation Playbook & Actions Matrix
- Open Discussion
- Closing





# GETTING TO ZERO

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

## Decarbonizing Transportation

Dr. Nilmini Silva-Send

University of San Diego School of Law

Idea #1

# Transportation Decarbonization Academic/Literature Approaches

Oct 27, 2022

# RDF Transportation Context

## ❑ Chapter 3: Accelerating Deep Decarbonization in the Transportation Sector

*Modeling approaches:*

### ○ EnergyPathways

- Used at UN, US, state, and regional level to understand primary energy supplies and demand for fuels

→ **scenarios of fuel shifts** needed to meet state targets

- Does not account for some behaviors such as speed, congestion, starts and stops, type of trip, other modes of travel, origin and destination attribution, VMT impacts of gasoline price, etc.

### ○ Activity-Based model ABM2+

- Used for CAP VMT data modeled from regional land use and transportation network.

→ **VMT output** is multiplied by a modeled (EMFAC) regional emission factor to **estimate GHG emissions**.

- Models aspects of the transportation network and land use with behaviors such as speed, congestion, starts and stops, type of trip, other modes of travel, origin and destination attribution, VMT impacts of gasoline price, etc.

## ❑ Chapter 8: Local Policy Opportunities - Based on Climate Action Plans

- CAPs represent a snapshot in time of (the stakeholder perspectives of) what local governments can do to regulate, incentivize and educate the community on ways to achieve GHG reduction.

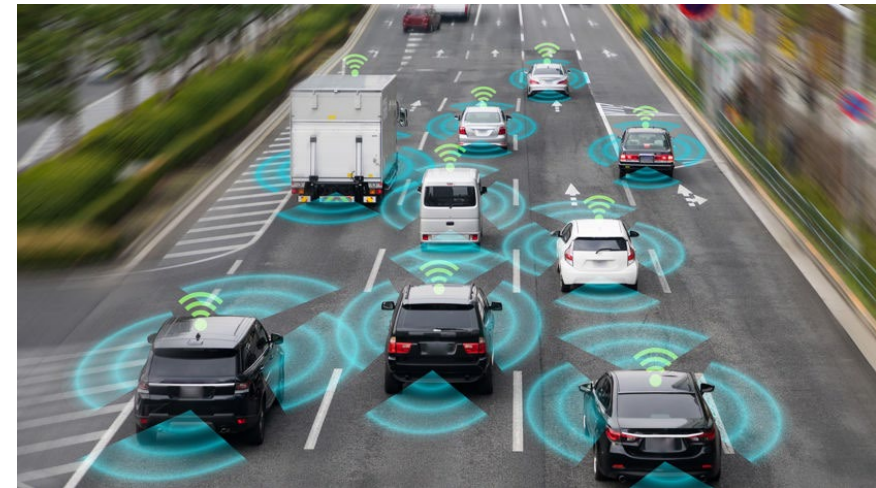
- GHG inventories monitor progress overall by jurisdiction

# Other Academic Discussions in Transportation Decarbonization - Supply and Demand

- ❑ For both passenger and freight transportation
  - Supply-side technological solutions
    - EV
    - Shared Autonomous Vehicles
    - Alternative engine types and fuels
  - Demand-side
    - Mobility demand
    - Mode shift
  
- ❑ Methodological Challenges ([Lefèvre et al. 2020](#))
  - Model-based projections
    - Deriving full quantified pathways (current lack of flexibility)
    - Considering the full set of decarbonization drivers
  - Policy-making
    - Lack of stakeholder participation (qualitative-quantitative participatory methods)

# Other Academic Discussions in Transportation Decarbonization - Autonomous Vehicles

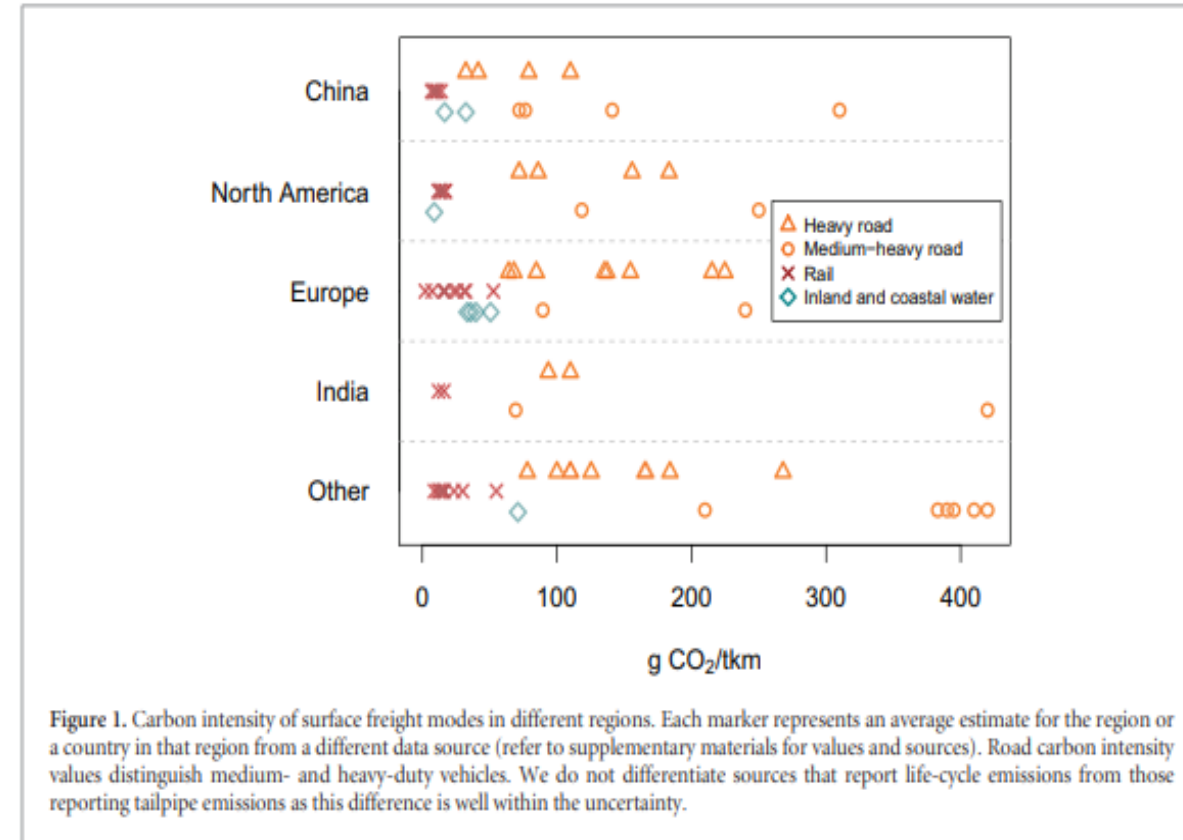
- ❑ Autonomous vehicles move passengers or cargo without human intervention
  - Full automation technology is still in its infancy
- ❑ Shared autonomous vehicles (SAV) could avoid GHGs by:
  - Driving more efficiently
  - Avoiding traffic congestion
  - Accelerating adoption of alternative fuel vehicles
  - Charging in alignment with renewable electricity generation.
- ❑ Implications ([Jones, et al., 2019](#))
  - Policymakers should put in place the necessary regulations and infrastructure to support SAV expansion
  - Especially in short to medium term, SAV adoption can be a more impactful lever than a carbon tax for decarbonizing vehicle travel.



# Other Academic Discussions in Transportation Decarbonization - Freight Systems

## □ Freight Systems decarbonization strategies ([Ghisolf et al., 2022](#))

- Reduce demand
  - Minimize the physical amount of goods to be delivered by making products last longer, recycling, digitization, and designing goods with less material
  - Price increases
- Shift to lower-carbon transportation modes
  - Shift road freight to electrified rail ([Kaack et al., 2018](#))
- Increase energy efficiency
- R&D alternative fuels
  - DOE research into e-methanol for ships



# Other Academic Discussions in Transportation Decarbonization

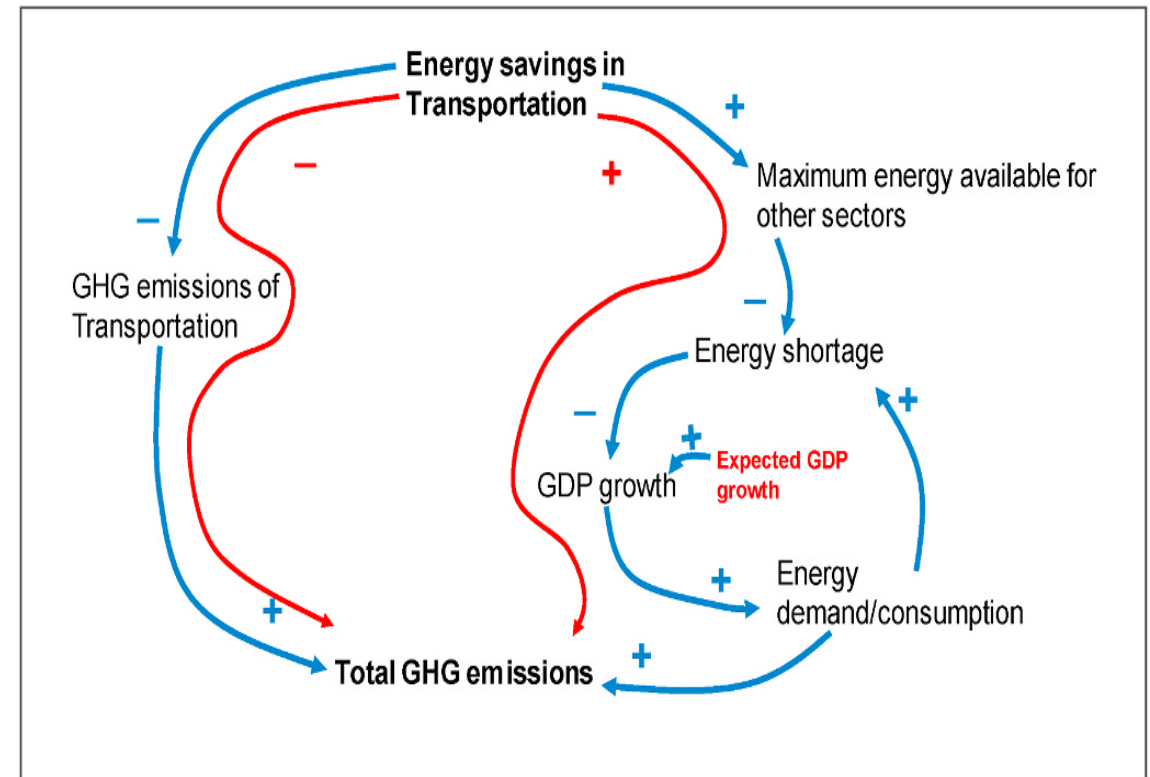
## - Limits of Transportation Electrification?

▣ Studies ([Blas et al., 2020](#)) show that a massive replacement of oil-fueled individual vehicles to electric ones alone cannot deliver GHG reductions consistent with climate stabilization

- Could result in the scarcity of some key minerals, such as lithium and magnesium.
- Energy-economy feedbacks within an economic *growth* system create a rebound effect that counters the benefits

▣ Solution suggested:

- Globally follow the “Degrowth Paradigm”
  - Quick and radical shift to light electric vehicles and non-motorized modes
  - Drastic reduction in total transportation demand.



# Thank you!

## ☐ References:

- Lefevre, J., Briand, Y., Pye, S., Tovilla, J., Li, F., Oshiro, K., ... & Zhang, R. (2021). A pathway design framework for sectoral deep decarbonization: the case of passenger transportation. *Climate Policy*, 21(1), 93-106.
- Jones, E. C., & Leibowicz, B. D. (2019). Contributions of shared autonomous vehicles to climate change mitigation. *Transportation Research Part D: Transport and Environment*, 72, 279-298.
- Ghisolfi, V., Tavasszy, L. A., Correia, G. H. D. A., Chaves, G. D. L. D., & Ribeiro, G. M. (2022). Freight Transport Decarbonization: A Systematic Literature Review of System Dynamics Models. *Sustainability*, 14(6), 3625.
- Kaack, L. H., Vaishnav, P., Morgan, M. G., Azevedo, I. L., & Rai, S. (2018). Decarbonizing intraregional freight systems with a focus on modal shift. *Environmental Research Letters*, 13(8), 083001.
- de Blas, I., Mediavilla, M., Capellán-Pérez, I., & Duce, C. (2020). The limits of transport decarbonization under the current growth paradigm. *Energy Strategy Reviews*, 32, 100543.





# GETTING TO ZERO

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

## Decarbonizing Transportation

Jim Misener

Qualcomm Technologies, Inc.

Idea #2

The background of the slide is a photograph of a busy city street during sunset. The sun is low on the horizon, creating a warm, golden glow that illuminates the scene. In the foreground, a person is riding a bicycle across the frame. To the left, a group of people is walking, and a white van is visible. The street is lined with tall buildings and trees, and the overall atmosphere is one of a bustling urban environment.

Qualcomm

**Transportation Working Group  
Workshop**

**October 27, 2022**

# V2X Impact on Energy and Environment

**Jim Misener**

**Sr Dir. Product Management and Global V2X Ecosystem Lead**

**Qualcomm Technologies, Inc.**

# How 5G and C-V2X are reshaping our roadways



Connected highways



4G/5G networks  
e.g. for TMC-based traffic monitoring & advisory



C-V2X  
e.g. for collision avoidance and coordinated driving



Precise positioning  
e.g. for lane management and lane-level navigation for crash avoidance

# C-V2X is a critical component to safety

C-V2X technology supports direct, low-latency communication between vehicles (V2V), roadside infrastructure (V2I) and pedestrians (V2P)

Vehicle-to-infrastructure  
(V2I)

e.g. traffic signal  
timing / priority



Vehicle-to-vehicle  
(V2V)

e.g. collision avoidance  
safety systems



Vehicle-to-network  
(V2N)

e.g. real-time traffic /  
routing, cloud services



Vehicle-to-pedestrian  
(V2P)

e.g. safety alerts to  
pedestrians, bicyclists



Designed specifically for transportation, C-V2X informs safety critical and mobility-benefiting applications

# C-V2X designed to work in the ITS 5.9 GHz spectrum

Vehicles talk to each other and roadside infrastructure on a harmonized, dedicated spectrum

## 3GPP support of ITS 5.9 GHz band

C-V2X support in ITS band was added in 3GPP Release 14

## Harmonized spectrum for safety

C-V2X uses harmonized/common, dedicated spectrum for vehicles to talk to each other

## Single channel operation

C-V2X can support V2V, V2I and V2P basic safety applications in a single channel

For US, single 20MHz channel is planned (5905 MHz – 5925MHz)

## Supports ITS use cases

Supports many long established ITS use cases





- C-V2X supports transit and multi-modal signal priority for more efficient movement through arterial and collector routes in **underserved communities**
- Data from V2X exchanges will inform **transportation management and operations** for increased efficiency to advance climate and sustainability goals
- C-V2X safety alerts can prevent non-impaired crashes that cause ~50% of **traffic congestion** in the U.S.<sup>1</sup>

### Equity



20-30%  
higher safety  
impact in  
underserved  
communities

### Environment



Up to 20%  
reduction  
in CO<sub>2</sub>  
emissions

### Efficiency



80%+  
reduction in  
multi-vehicle  
crashes<sup>2</sup>

## C-V2X benefits society and the environment

# C-V2X is ready for deployment

Showcased and tested with ecosystem



# Thank you

**Qualcomm**

Follow us on: [in](#) [twitter](#) [instagram](#) [youtube](#) [facebook](#)

For more information, visit us at:

[qualcomm.com](http://qualcomm.com) & [qualcomm.com/blog](http://qualcomm.com/blog)

Nothing in these materials is an offer to sell any of the components or devices referenced herein.

©2018-2022 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm is a trademark or registered trademark of Qualcomm Incorporated. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of our engineering, research and development functions, and substantially all of our products and services businesses, including our QCT semiconductor business.





# GETTING TO ZERO

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

## Decarbonizing Transportation

Kyle Heiskala

Environmental Health Coalition

Idea #3



# Transportation & Climate from an Environmental Justice lens

County of San Diego  
Regional Decarbonization Framework (RDF)

Land Use & Transportation RDF Working Group  
10/27/2022

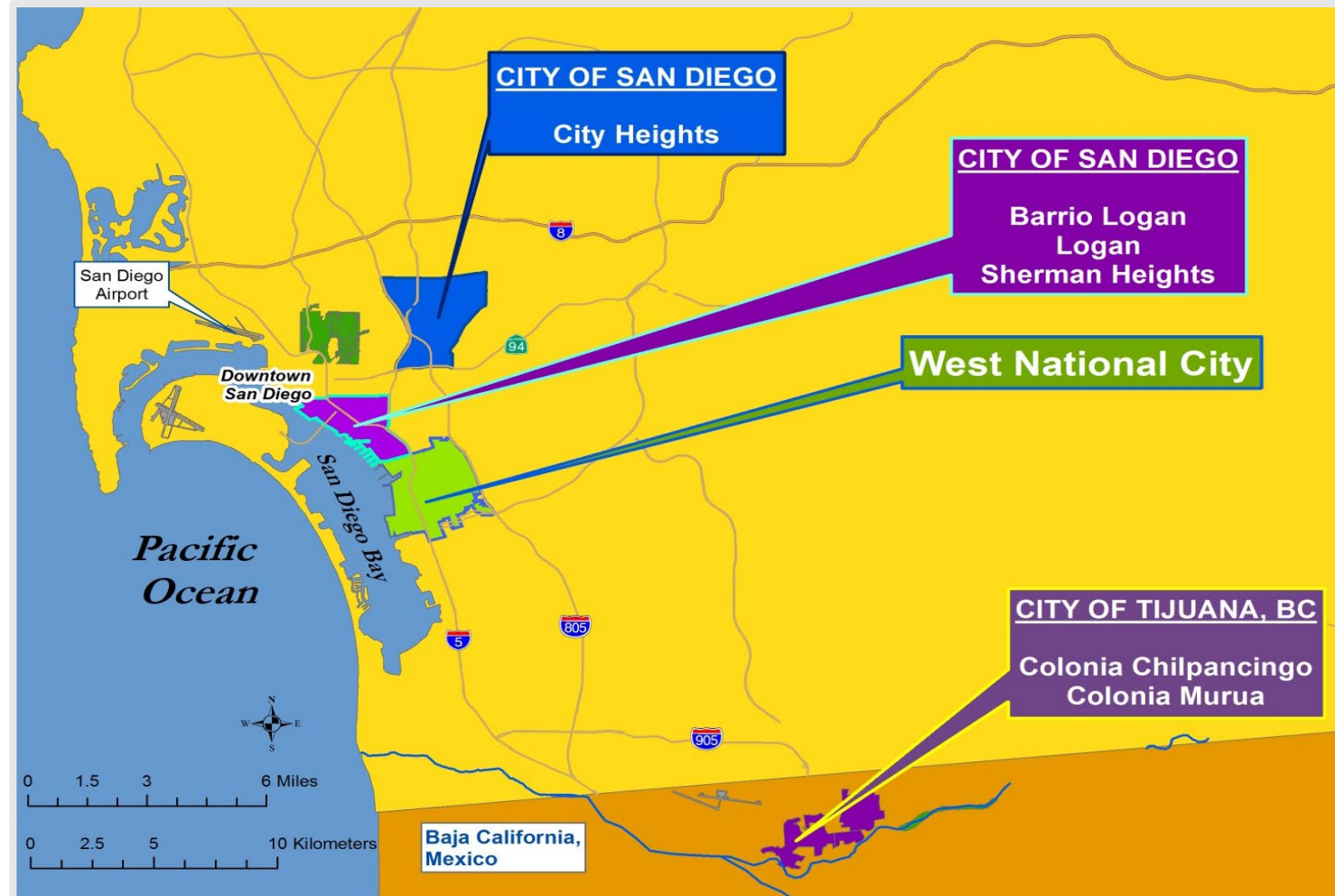
# What we'll cover:

1. Context: Environmental Justice
2. Problems: Transportation
3. Solutions: Prioritizing Mass Transit



# 1. Context

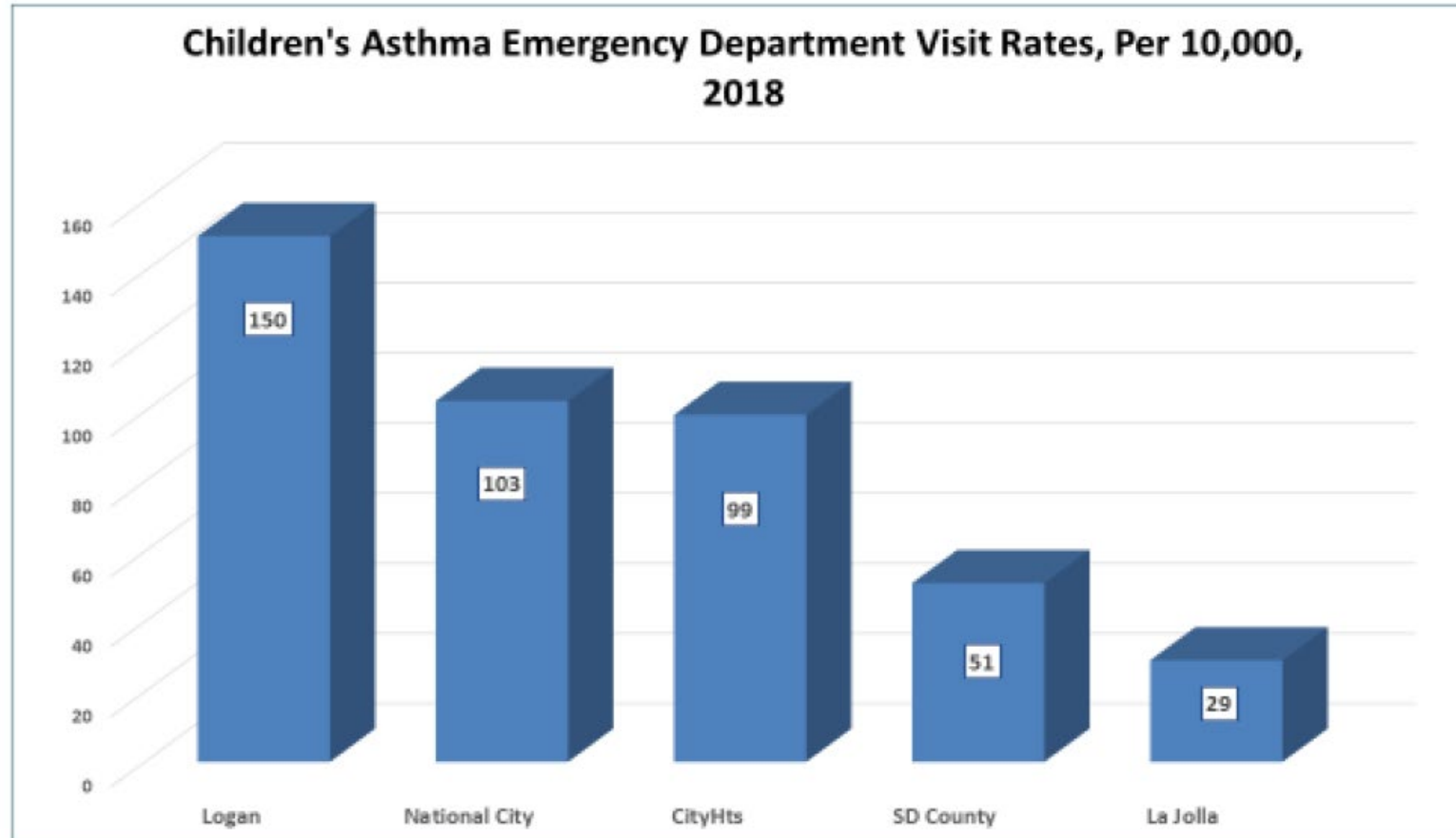
# Environmental Justice Communities



# This is what environmental *in*-justice looks like:



# Measuring Health Disparity in EJ Communities

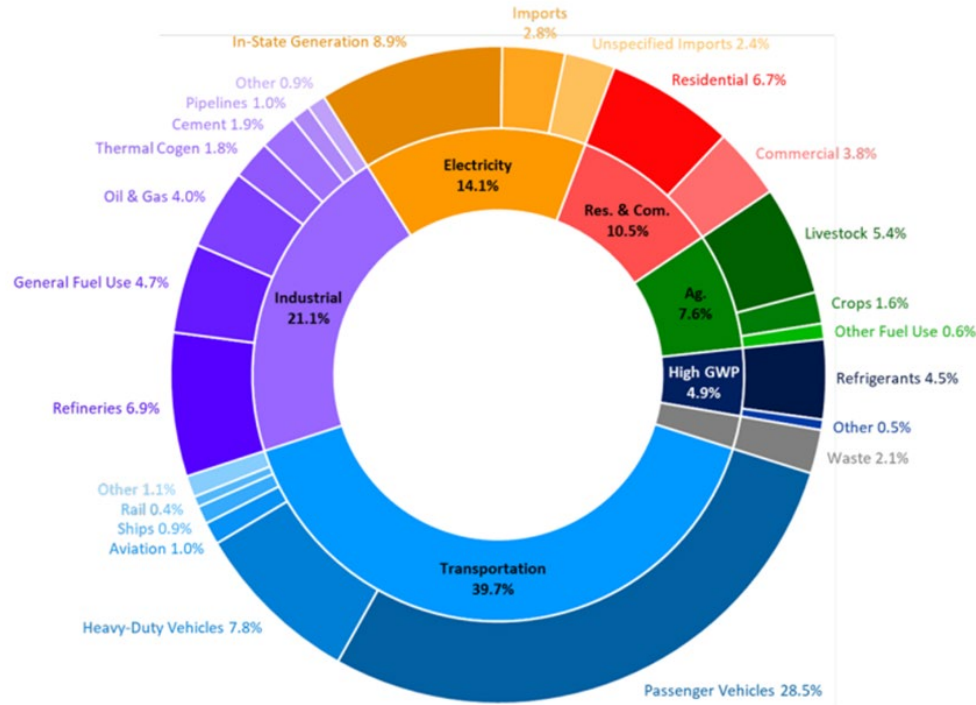


# 2. Problems

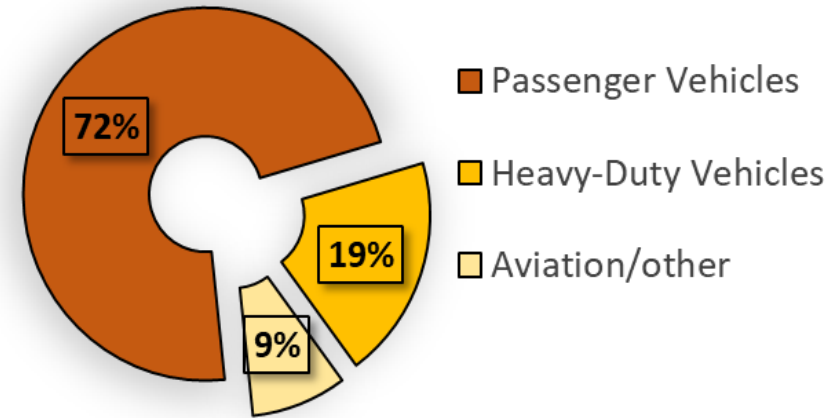


# PROBLEM #1: CARS

## CALIFORNIA'S LARGEST SINGLE GHG EMISSION SOURCE



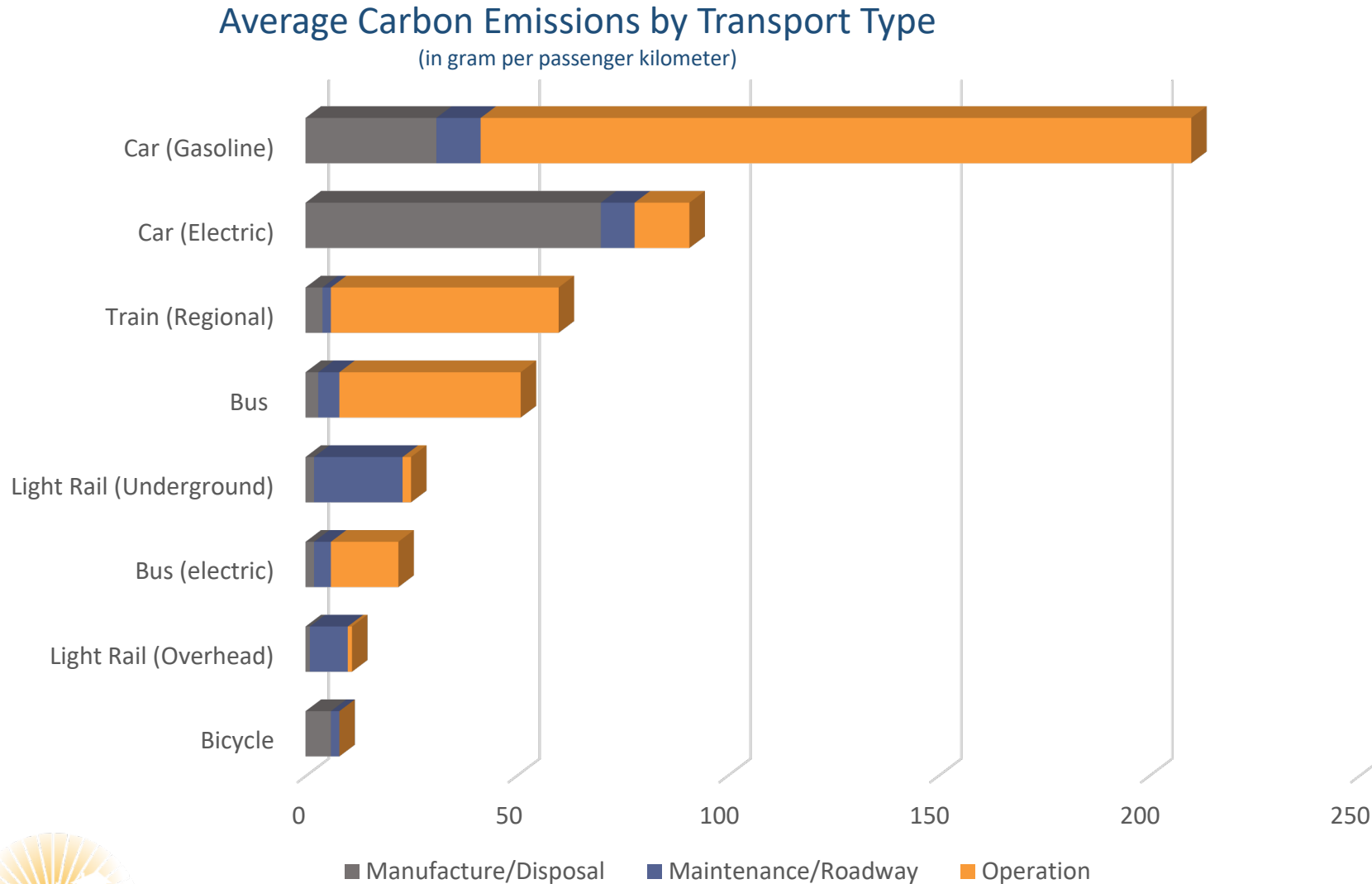
2019 GHG Emissions by Scoping Plan Sector & Sub-Sector Category



California Transportation Emissions by Vehicle Type



# PROBLEM #2: EV'S ALONE WILL NOT BE A SOLUTION



# PROBLEM #3: Lithium Mining is Destructive and Costly to People and the Planet



# 3. Solutions

# Environmental Justice & the Climate Crisis



Clean Air



Transportation

Housing



*SOLUTION:*

**Prioritizing EJ communities means transit first!**





1. A Regional Plan that prioritizes EJ
2. Youth opportunity passes
3. Bus service every 10 minutes
4. Blue Line Express
5. 24- Hour service
6. The purple line
7. An all-electric bus fleet by 2030
8. Anti-displacement strategies
9. Restroom access
10. Emergency-Ready Transit System



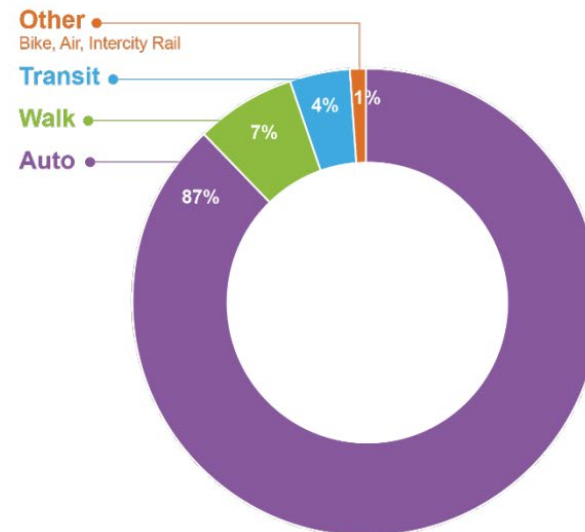
## SOLUTION:

# California transportation policy that centers EJ

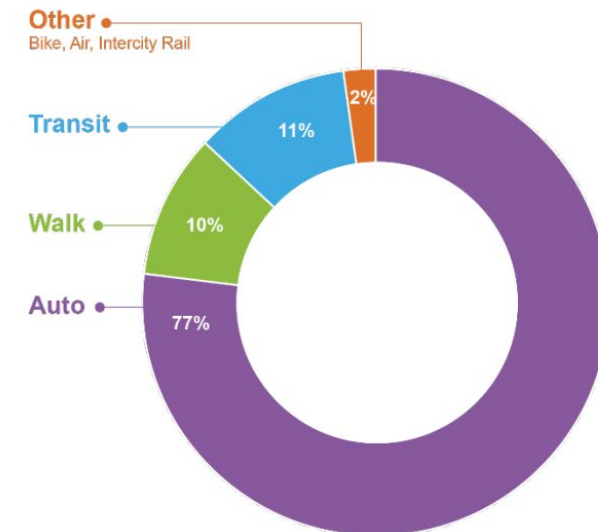
- Rapid transition Heavy-Duty zero-emission vehicles (ZEV) by 2036 and 100% of all on-road drayage (trucks at ports) ZEV by 2030
- 25% reduction in vehicle miles traveled (VMT) per capita by 2030

*Mode Share in  
California  
Transportation  
Plan 2050*

2050 BASELINE MODE SHARE



COMBINED SCENARIO MODE SHARE



Source California Transportation Plan 2050

<https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf>



# Prioritizing EJ Communities looks like:

- EJ community consulted first & remain at table
- Clean air strategies integrated in climate policies
- Fast, reliable and affordable public mass transit!
- Affordable housing and anti-displacement
- Equity funding commitments in climate plans
- Investing (in transit) in EJ communities first



# Implementation Playbook: Level of Approach



Organizational  
Operations



Community



Region

# Playbook Implementation Mechanisms

- Analysis/Research
- Capital Project
- Education
- Incentive
- Partner/Collaborate
- Plan
- Program
- Requirement/Policy

# Playbook Criteria

- GHG Reduction Potential
  - Relative GHG reduction compared to other actions
  - Some actions have no direct reduction (e.g., education)
    - Difficult to estimate GHG impact of an education webpage
    - Methods to estimate GHG impact of adding bike lanes
- Time to Complete
  - Relative time it would take to complete an action
  - Quicker to add a page to a website than to build bike lanes
- Cost to Implement
  - Relative cost to implement an action
  - Cheaper to add a page to a website than build bike lanes



# Playbook Criteria

- Preliminary Estimates
  - “Average” of the category of actions
  - Not possible to comment on all potential actions
    - Education could be: page of a website or a TV commercials
  - Intended to provide initial screening for decision making
- Other Considerations
  - Co-benefits of actions (e.g., air pollution, environmental quality, and public health)
    - Primary concern of RDF is GHG emissions
  - Workforce and equity



# Organization (more actions in the online document)

Transportation				
Reduce Vehicle Miles Driven				
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Conduct an analysis to better understand employee commute patterns and total emissions impact	Analysis/Research	0-2 yrs	N/A	L
Provide bike facilities at buildings and sites (new and existing)	Capital Project	3-5 yrs	L	M
Purchase e-bikes for municipal employee use	Capital Project	0-2 yrs	L	M
Participate in SANDAG's iCommute program to develop and implement a customized commuter benefit program for employees	Education	0-2 yrs	N/A	L
Develop a transportation demand management (TDM) plan for employees	Plan	0-2 yrs	N/A	L
Develop a conventional and/or e-carshare program	Program	0-2 yrs	L	M
Adopt a telecommute program for employees	Requirement/Policy	0-2 yrs	M	L
Adopt alternative work schedules for employees	Requirement/Policy	0-2 yrs	L	L
Adopt remote work policy for employees	Requirement/Policy	0-2 yrs	L	L
Alternative Fuel Vehicles				
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Assess the use of hydrogen in private fleet vehicles that cannot be converted to zero emissions technology	Analysis/Research	0-2 yrs	N/A	L
Assess the feasibility and timeline to convert existing fleet to low- and zero-emissions vehicles	Analysis/Research	0-2 yrs	N/A	L
Provide designated parking for low- and zero emissions vehicles at facilities and public parking lots	Capital Project	0-2 yrs	L	M
Procure low- and zero emissions vehicles for organizational fleets	Capital Project	3-5 yrs	M	H
Install a public low-carbon fuel (e.g., hydrogen) fueling station at organizational facilities	Capital Project	3-5 yrs	L	H

# Community

(Some examples, many more available in online document)

Transportation				
Reduce Vehicle Miles Driven				
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Monitor bicycle lane usage	Analysis/Research	0-2 yrs	N/A	L
Evaluate transit routes and frequency	Analysis/Research	0-2 yrs	N/A	L
Identify areas that can support increased population or employment	Analysis/Research	0-2 yrs	N/A	L
Expand bikeway network	Capital Project	5 yrs +	L	H
Develop and implement active transportation master plan	Capital Project	5 yrs +	L	H
Implement transit-supportive roadway treatments	Capital Project	5 yrs +	L	H
Alternative Fuel Vehicles				
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Advocate for a common software platform to streamline EV charging	Advocacy	0-2 yrs	N/A	L
Develop a method to estimate GHG impacts that accounts for hourly emission rates	Analysis/Research	0-2 yrs	N/A	L
Designate Zero Emissions Delivery Zones	Capital Project	3-5 yrs	N/A	M
Designate a percentage of street parking spaces in certain areas for EVs and AFVs	Capital Project	0-2 yrs	N/A	M
Reduce Fuel Use				
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Evaluate potential locations for future roundabouts including factors like accident and speeding ticket rates	Analysis/Research	0-2 yrs	N/A	L
Assess speed limits to determine viability of electric golf carts	Analysis/Research	0-2 yrs	N/A	L
Replace traffic signals where feasible with roundabouts	Capital Project	5 yrs +	L	H

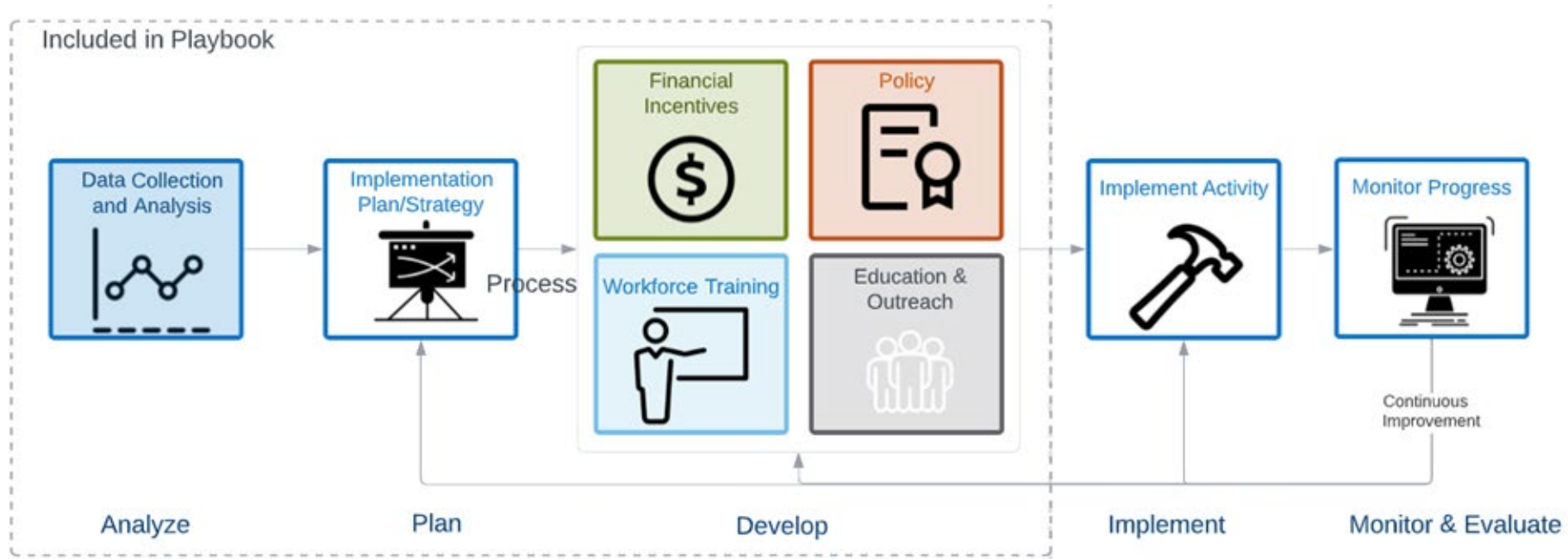
# Region

<b>Transportation</b>				
Reduce Vehicle Miles Driven				
<b>Activity</b>	<b>Implementation Mechanism</b>	<b>Estimated Time to Complete</b>	<b>Estimated Potential GHG Impacts</b>	<b>Estimated Cost to Implement</b>
Evaluate feasibility of congestion and cordon pricing	Analysis/Research	0-2 yrs	N/A	L
Conduct a transportation demand management study	Analysis/Research	0-2 yrs	N/A	L
Evaluate transit routes and frequency	Analysis/Research	0-2 yrs	N/A	L
Complete a regional transportation equity analysis	Analysis/Research	0-2 yrs	N/A	L



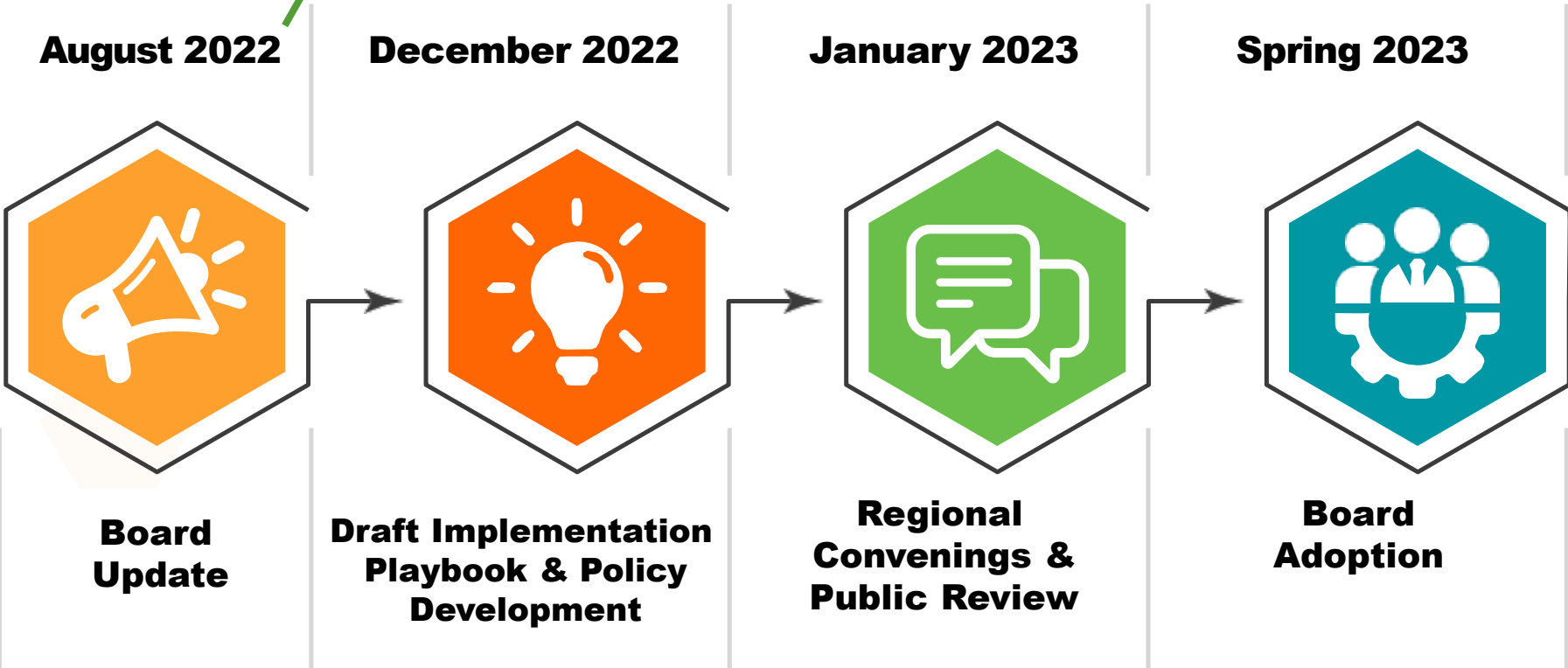
# What we need from you...

1. In your experience what has worked or not worked in terms of existing policies?
2. What programs could benefit underserved communities or have adverse impacts?
3. What are solutions that are not in the database?



# Timeline

Also: Transportation matrix of actions is on the Engage site for your feedback!



**PROGRAM DETAILS**

Public Workshop	Completion of Technical Report & Workforce Development Reports	<b>Special Topic Working Groups</b>	Implementation Playbook 1st Draft Released	Draft Sustainable Agriculture & Food Systems Policy Report	Final Implementation Playbook
-----------------	--	-------------------------------------	--	--	-------------------------------

**Implementation Playbook & Framework Adoption**



County of San Diego



GETTING TO  
**ZERO**

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

# Transportation Working Group

October 27, 2022