Southern California Zero Emission Truck Infrastructure (ZETI) Study

October 11, 2023

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Welcome

What are you hoping to get out of today's TAC meeting?

Please provide a one word answer in the chat, thank you!

Welcome

Jonathan Raspa

SCAG Project Manager

Re-introducing the Project Team

SCAG
INNOVATING FOR A BETTER TOMORROW

CAMBRIDGE SYSTEMATICS

C+R
ASSOCIATES

ICF

redhillgroup
THE POWER OF INSIGHT

Tioga

BERKELEY LAB

Re-introducing TAC Member Organizations

Technical Advisory Committee Meeting #2

Agenda

- Welcome and Introductions
- Project Phase Review
- Recap of Kickoff TAC meeting
- Project Progress to Date
- Stakeholder Engagement Themes
- TAC Engagement/Feedback
- Open Discussion and Q&A
- Next Steps

PROJECT REVIEW

Project Phase Review

PHASE 1

Literature Review and Outreach Programs

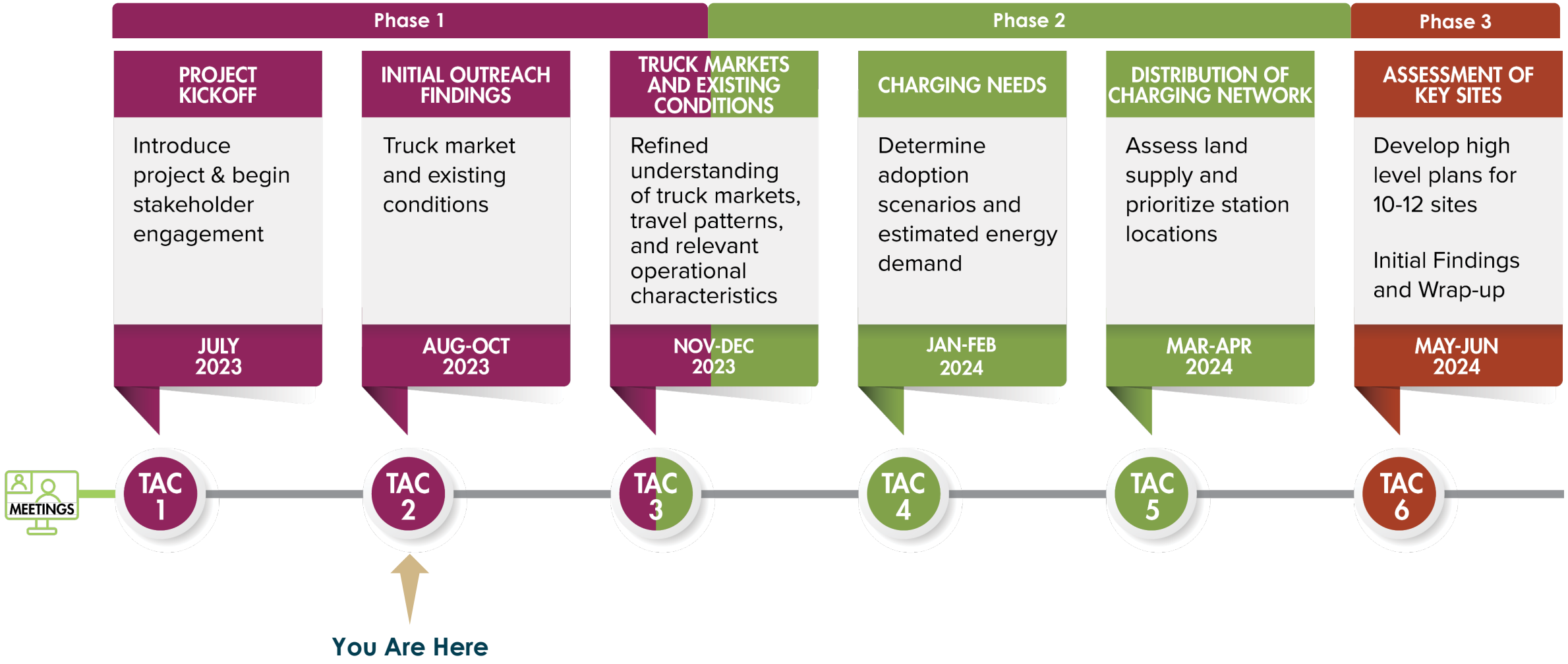
PHASE 2

Technical Work

PHASE 3

Identify Locations for ZETI and develop Regional Plan

Project Phase Review, detail



Recap of Kickoff TAC

- Held July 13, 2023
- 25 organizations representing a variety of interests/viewpoints
- Presented project study goals and parameters
- Presented roles and responsibilities of TAC members
- Heard from TAC members:
  - Experience with ZETI
  - Current thoughts about ZETI
  - Questions about this study
  - Recommendations of stakeholders to include in the study

Recap of Kickoff TAC meeting Next Steps

- Project Team to pursue outreach to TAC member-recommended organizations/persons
- Continue technical work; data analytics and modeling
- Integrate outreach findings with technical approach to strengthen model results, takeaways, and insights
- TAC Meeting #2: Describe technical framework and preliminary literature review and outreach findings

Recap of Kickoff TAC meeting Next Steps

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Recap of Kickoff TAC meeting Next Steps

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- Continue technical work; data analytics and modeling ✓
- Integrate outreach findings with technical approach to strengthen model results, takeaways, and insights ⧗
- TAC Meeting #2: Describe technical framework and preliminary literature review and outreach findings ✓

PROJECT PROGRESS TO DATE

Project Progress to date, Phases

LITERATURE REVIEW, OUTREACH, AND SURVEY

- ☑ Completed the literature review
- ☑ In process of Surveying Truck fleet
- ☑ Conducting Focus Groups and Stakeholder Interviews
- ☑ Held First Technical Advisory Committee Meeting

PHASE 1

TECHNICAL WORK

- ☑ Completed Truck GPS Data Analysis
- ☑ Completed Truck Trip Expansion
- ☑ Identified Market Segments
- ☑ Incorporated Payload Information

PHASE 2

Project Progress to date, Outreach

TAC

2 TAC stakeholder meetings

Surveys

100+ surveys of trucking professionals

Interviews

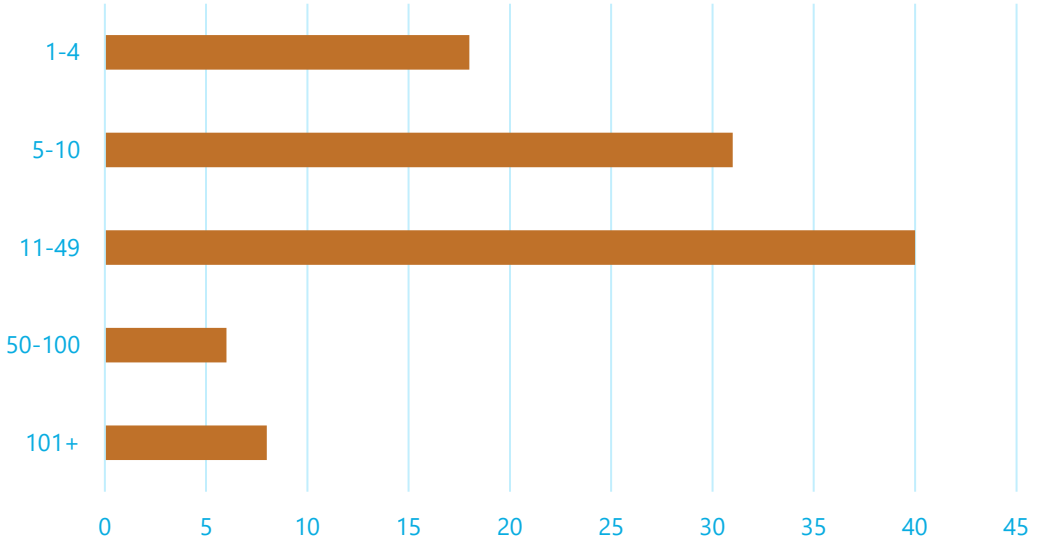
11 interviews of public and private stakeholders

Focus Groups

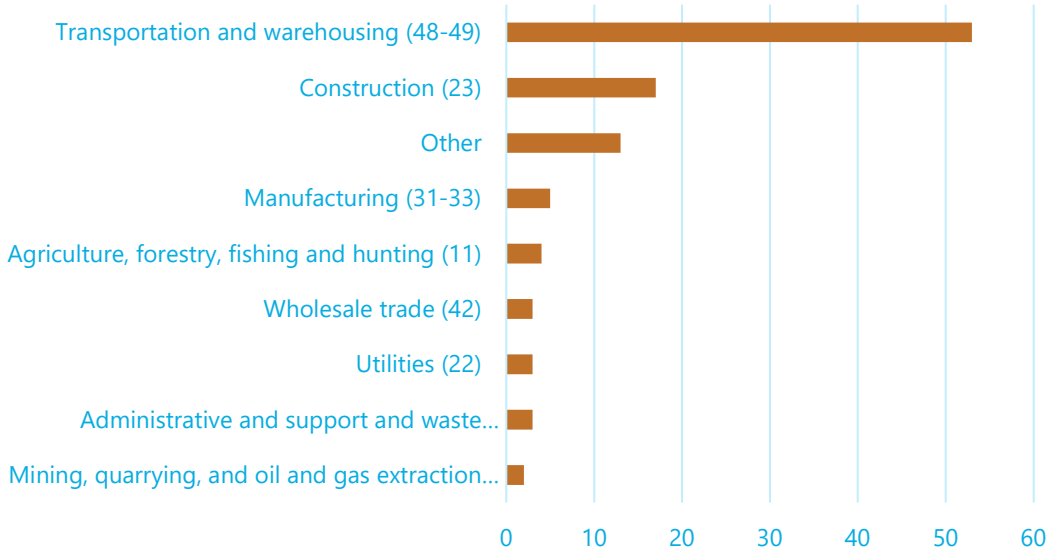
3 focus groups of public and private stakeholders

Who is being surveyed?

How many class 3+ trucks (10,000 or more lbs) are operating out of this location?

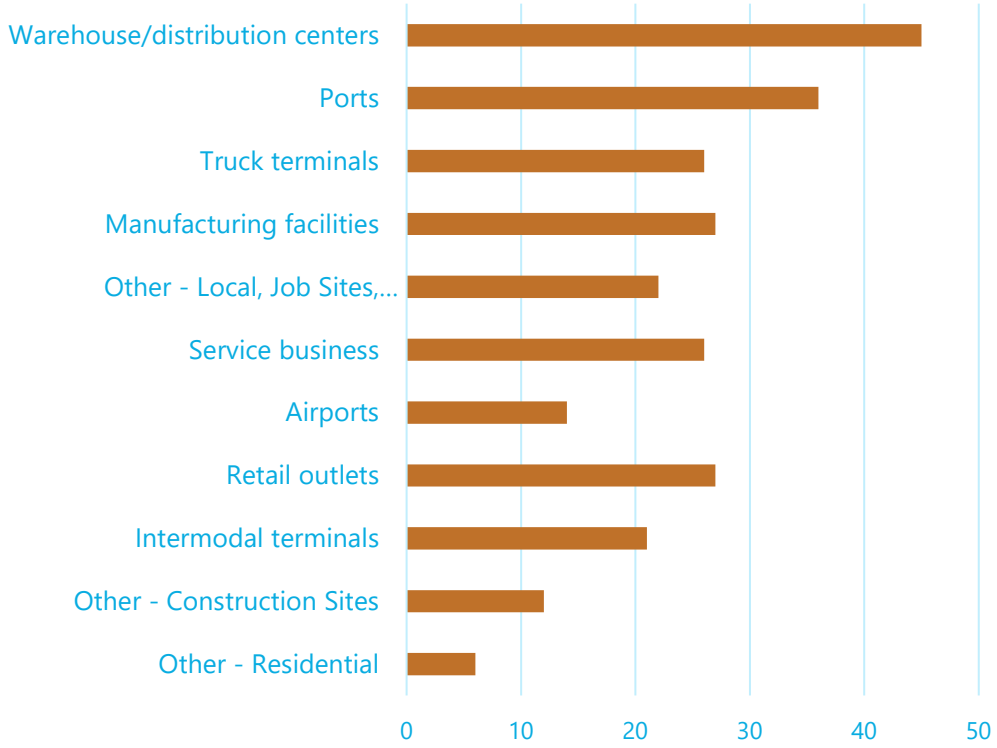


Which of the following best describes the industry for your organization?

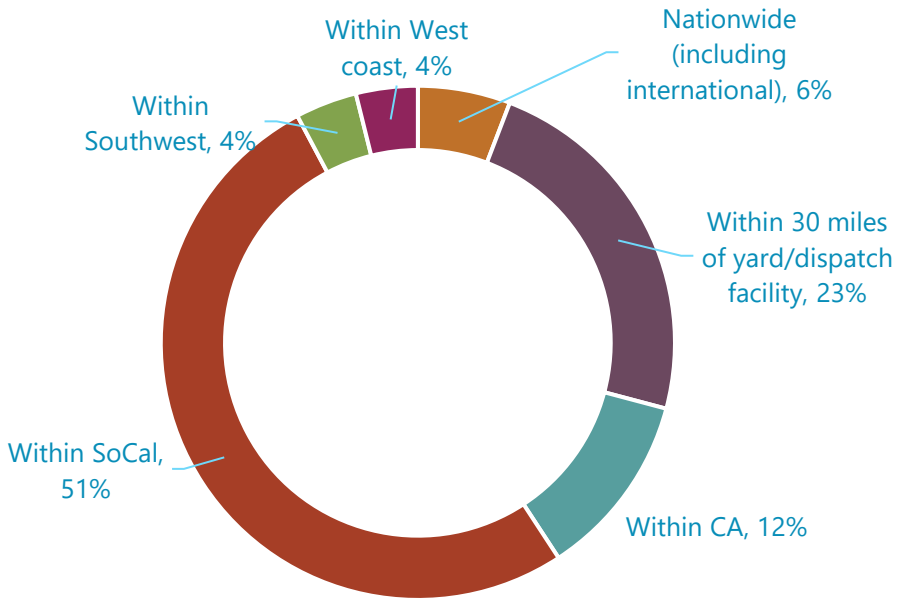


Travel Patterns

What are the most common types of destinations for these trucks?

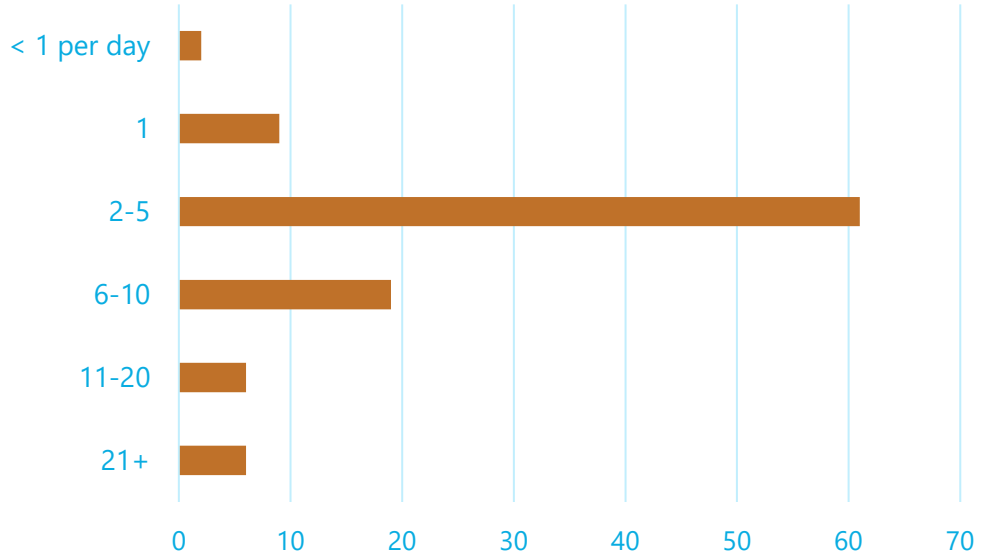


Which of the following best describes the primary travel area for these trucks?

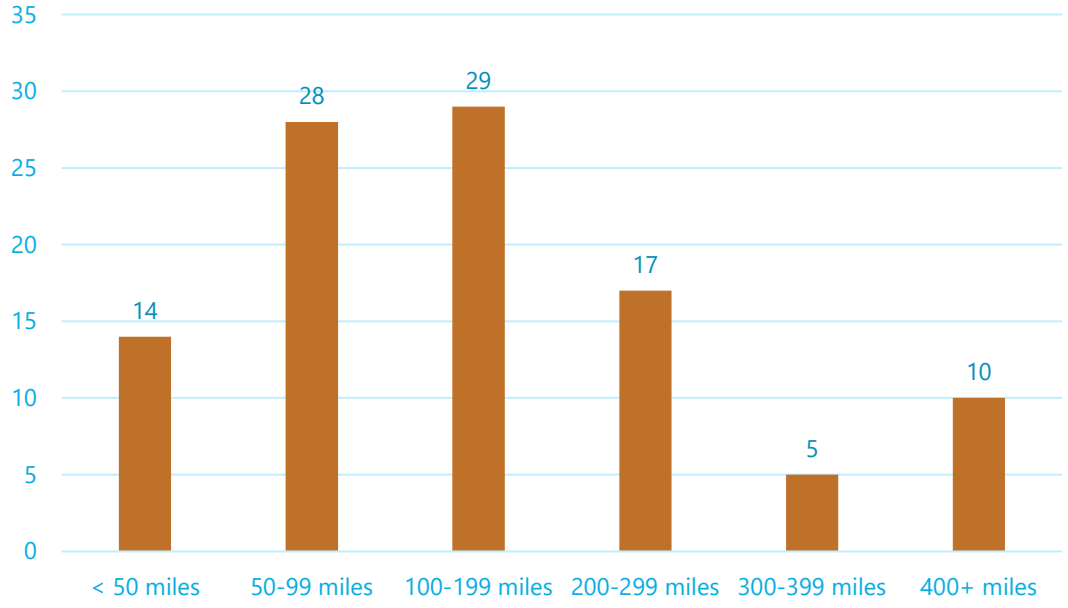


Travel Patterns

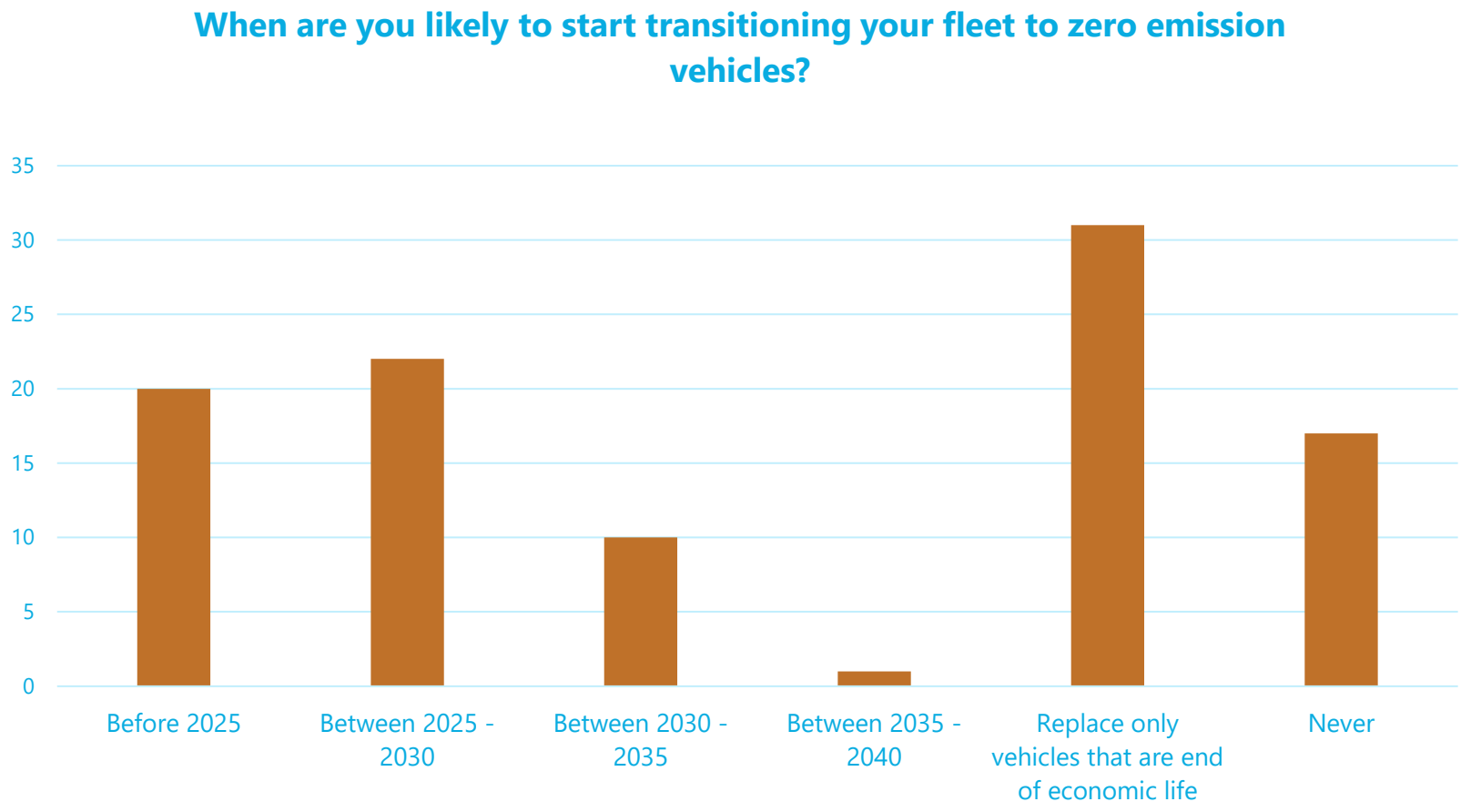
Which of the following best describes the average number of stops a truck make per day?



Which of the following best describes the average daily mileage for trucks in your fleet?

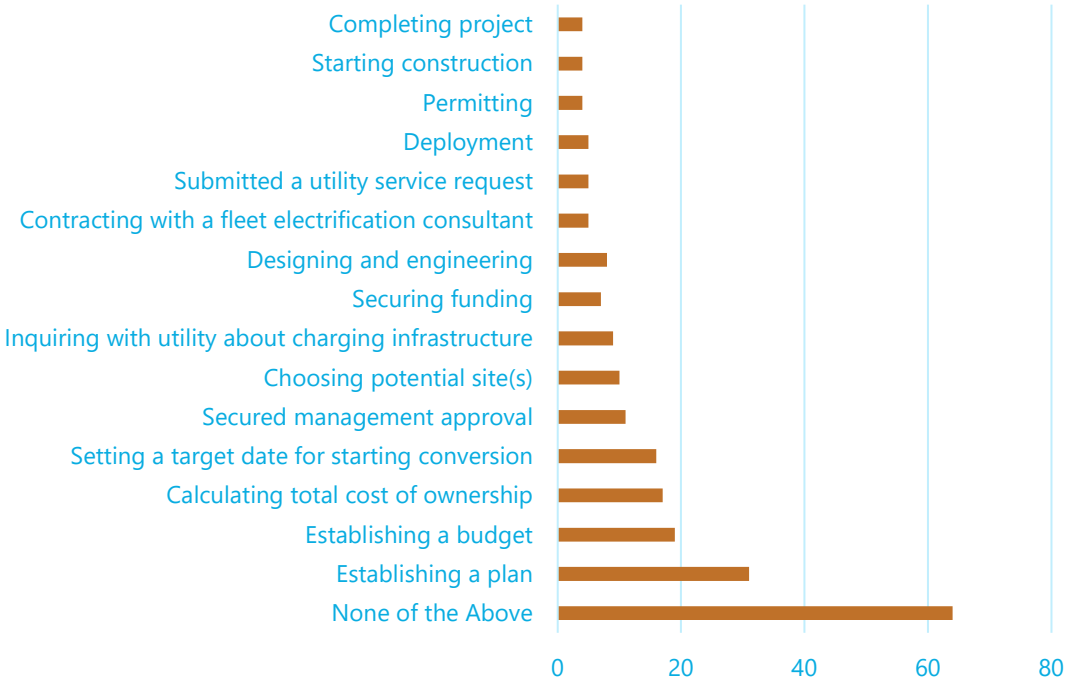


Zero Emissions Planning

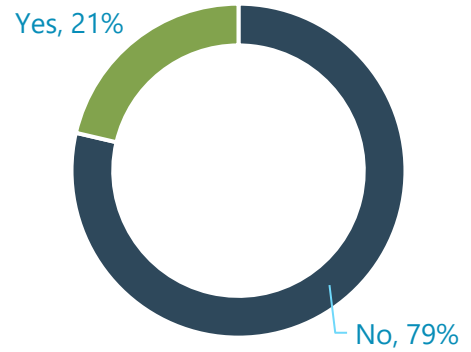


Zero Emissions Planning

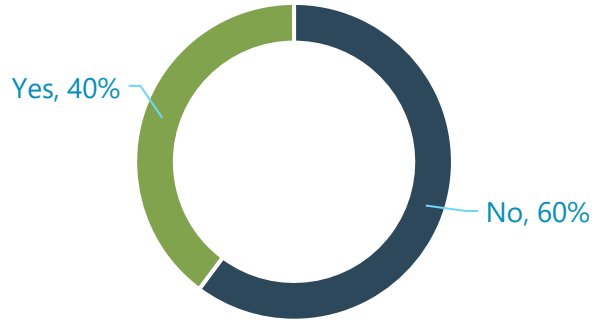
Which of the following, if any, has your organization done relative converting your fleet to Zero Emission trucks?



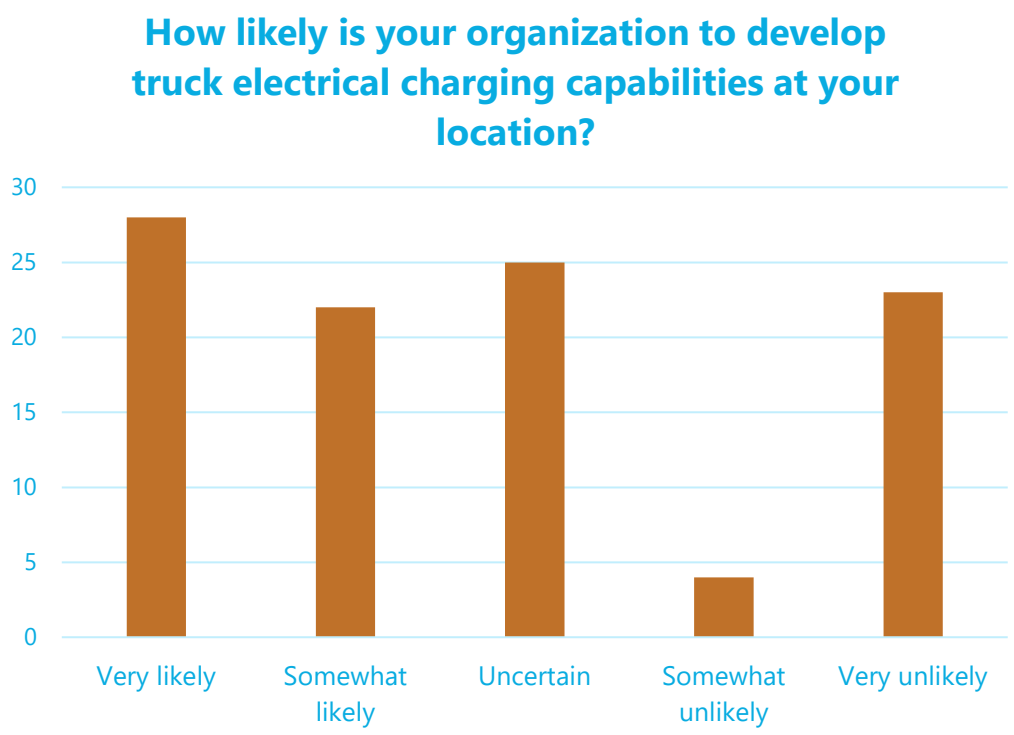
Have you had discussions with utilities about electrification?



Have you had discussions with Zero Emission vehicle manufacturers to explore purchasing Zero Emission commercial vehicles?

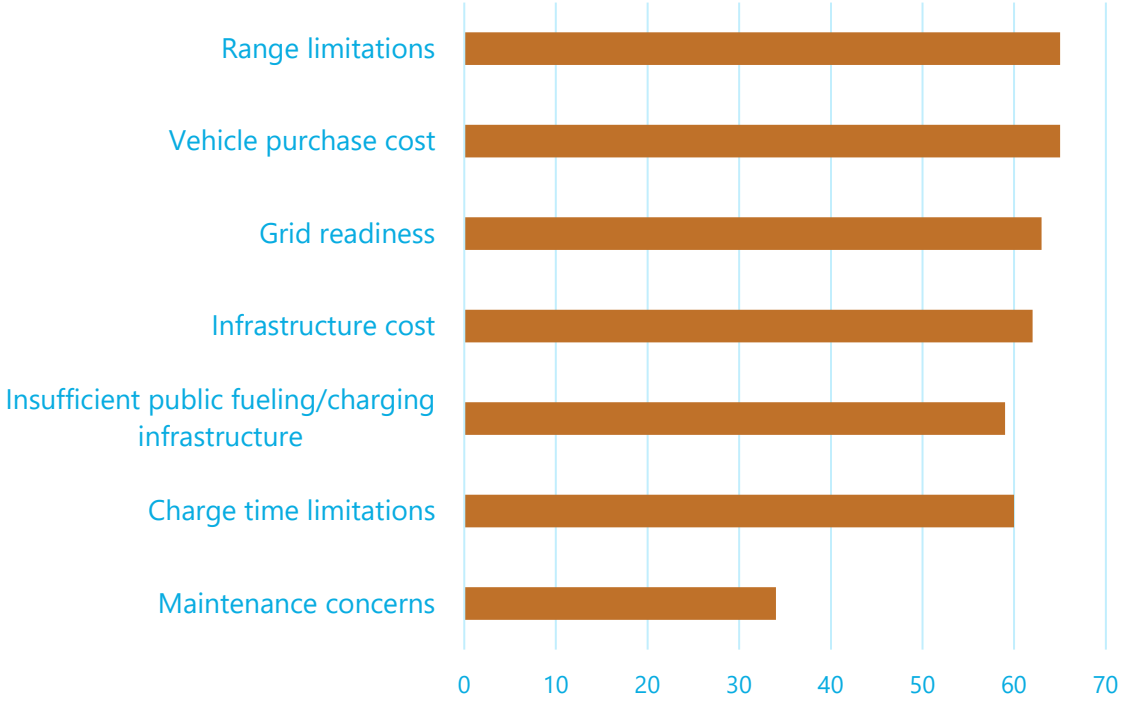


Where will charging/fueling infrastructure be installed?

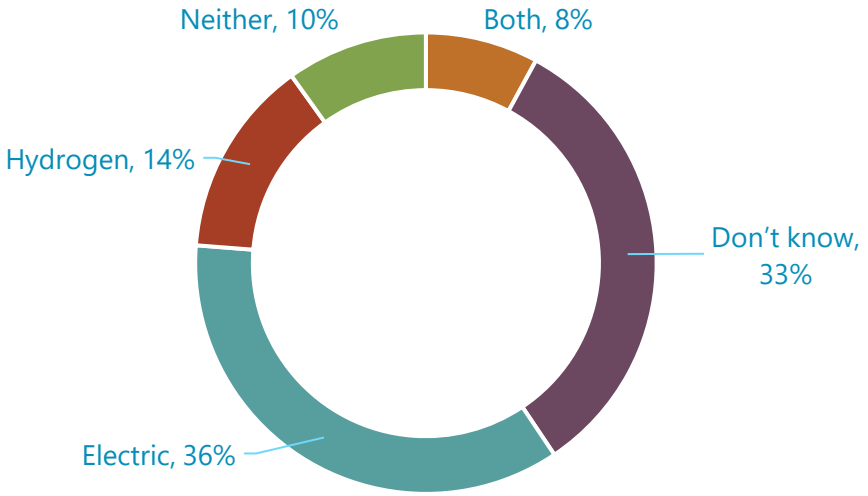


Barriers to Zero Emissions

What are the barriers to converting to Zero Emission trucks?

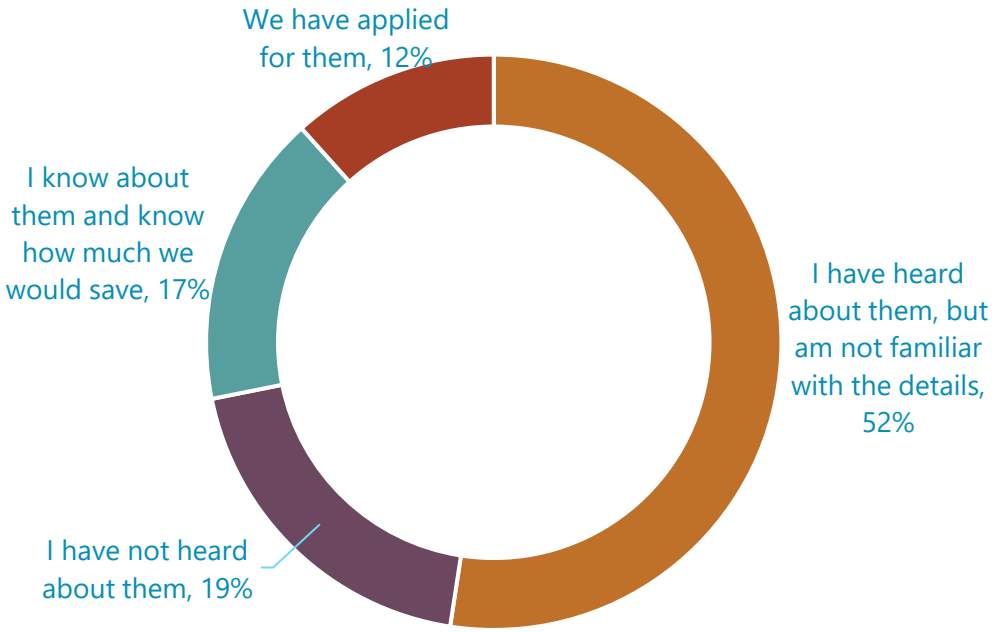


Which Zero Emission Fuel technology, electric or hydrogen, do you think you are more likely to pursue?

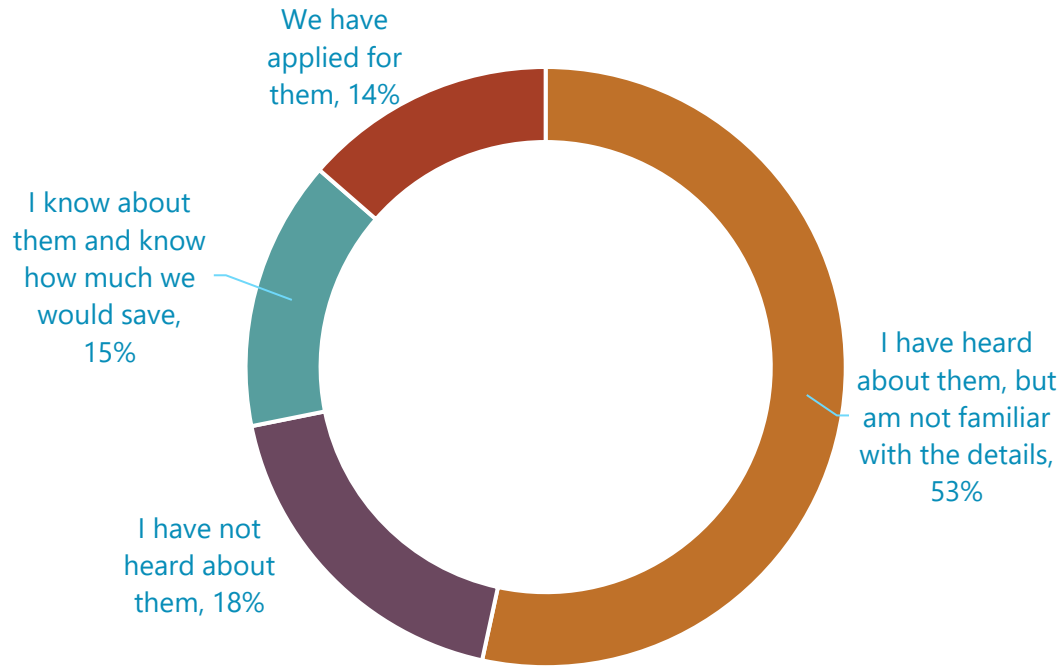


What do you know about Incentives for ZETs?

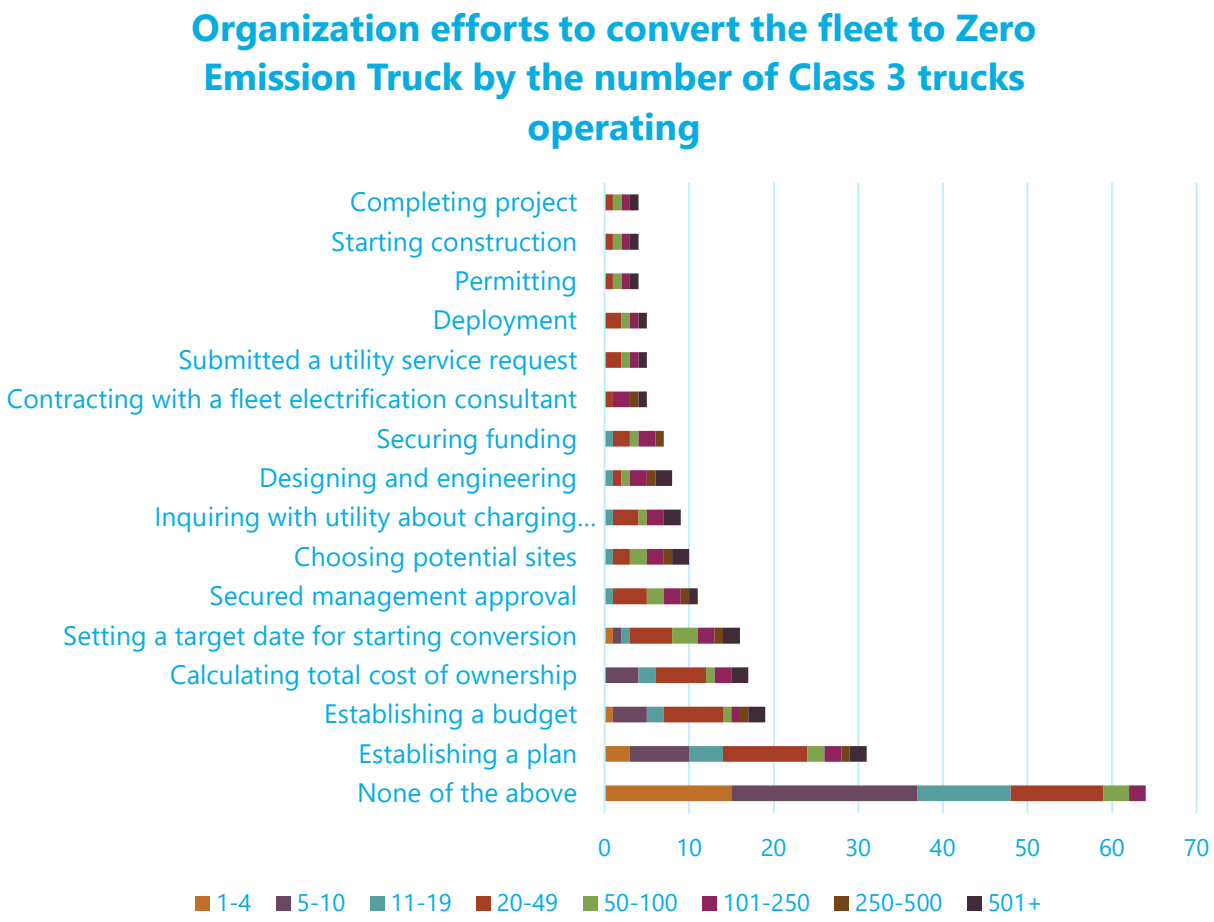
How familiar are you with California state incentives to support the purchase of ZETs?

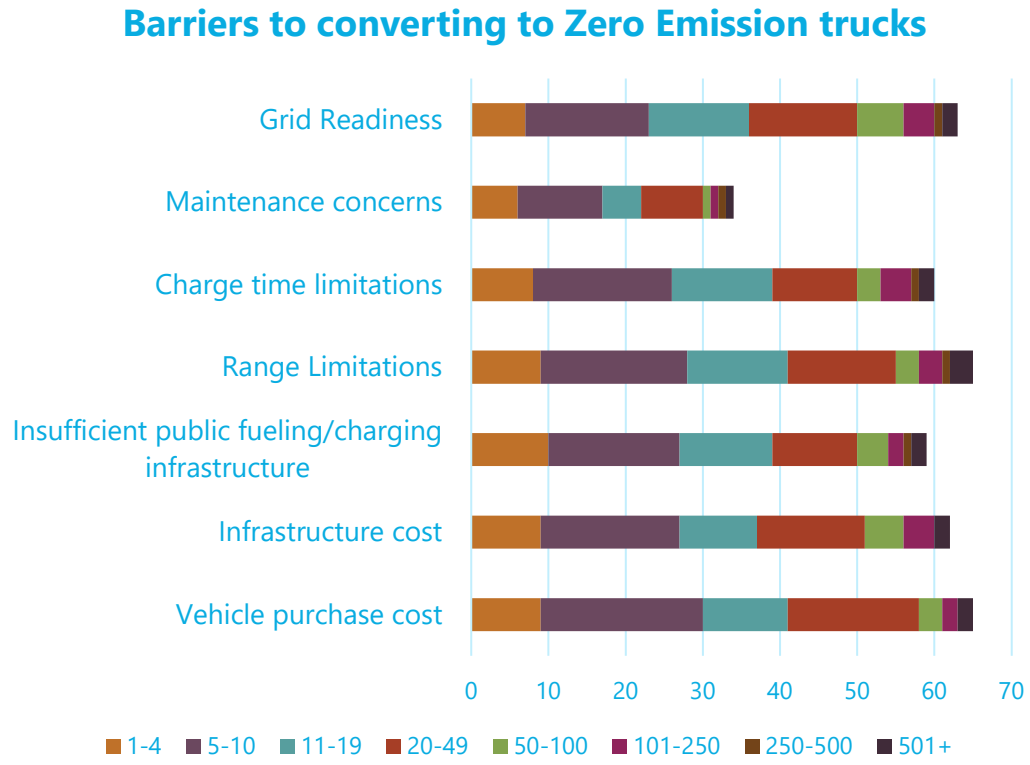


How familiar are you with Federal incentives to support the purchase ZETs?



Barriers and efforts to converting to ZET





Project Progress to date - Data Truck Travel Demand

Truck GPS Data (Step 1)	Trip Expansion (Step 2)	Market Segmentation (Step 3)	Payloads (Step 4)
Process Disaggregate Truck GPS Data Generate Truck Trips and Daily Travel Patterns	National Commercial Vehicle Surveys Traffic Counts	Observed Truck GPS Data Patterns Land Use Data	FAF CA-VIUS Caltrans and SCAG Truck Models
Preliminary Truck Flow Data	**Expanded Truck Flow Data**	**Linked Trip Travel for Different Segments**	**Truck Travel w/ Commodity and Payload Allocation**

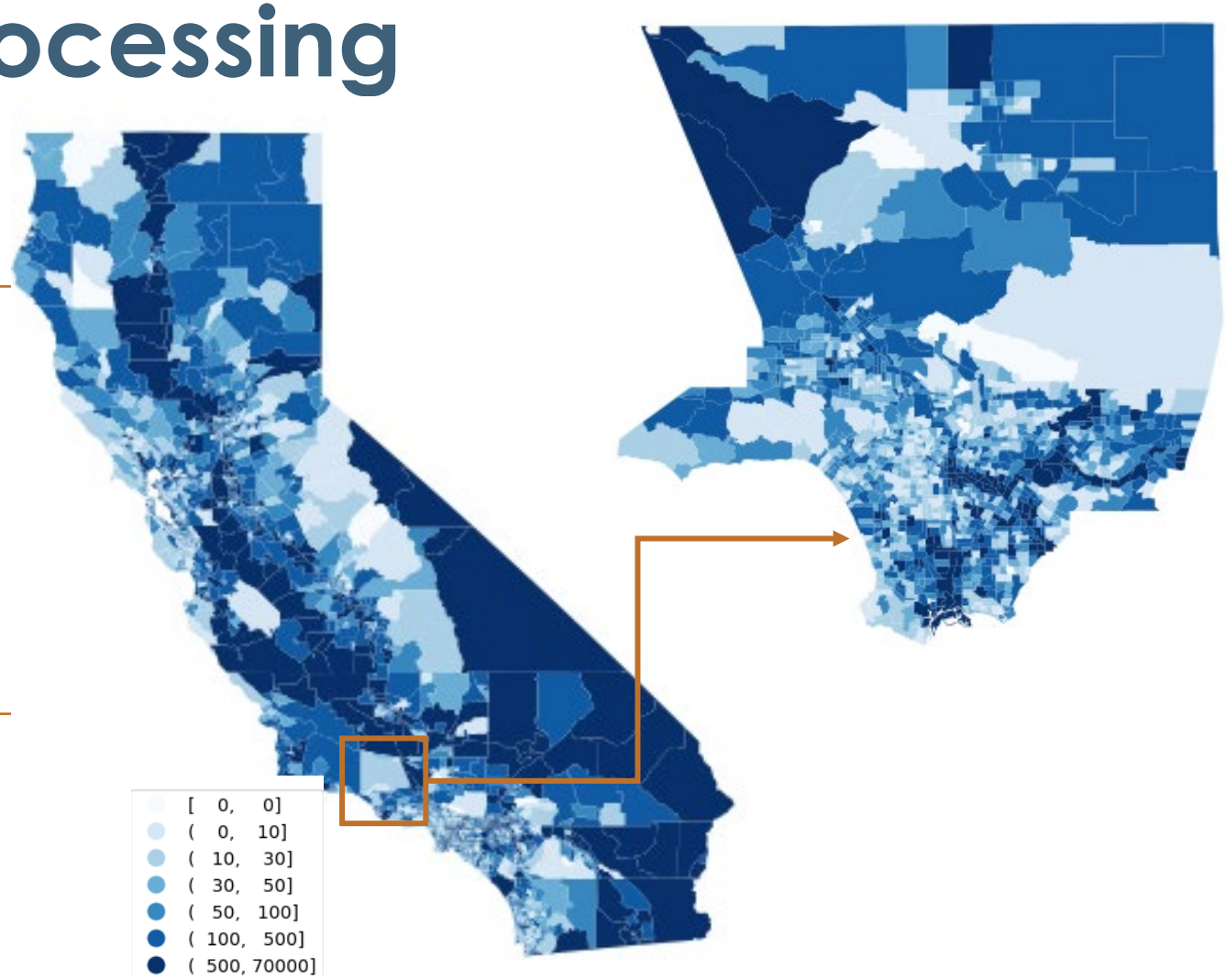
Truck GPS Data Processing

Truck Category

- **Two vehicle categories**
  - Medium (10k – 26k lbs)
  - Heavy (>26k lbs)

Samples

- **Truck GPS data from Feb, May, Sep, Nov 2021**
- **Sample size**
  - Medium duty truck (MDT): 25 million trips
  - Heavy duty truck (HDT): 3.5 million trips



Heavy-Duty Truck Trip Sample Coverage

Summary of Data Analysis

- The GPS data analysis provides an understanding of where trucks are traveling over the course of day; how many times they stop, where they stop, and for how long
- The data provided will be integrated with findings from the survey to help us develop a range of future ZET adoption scenarios to better understand potential charging locations
- The data will be incorporated into an energy simulation model that will allow us to identify charging sites under a range of future scenarios

Trip Expansion

Trip Targets

Source:
Regional Truck Surveys

Trip rate:
per employer by industry, delivery/shipment, truck category

Geography:
Census tract

Sample

Seeds:
Sample Truck GPS data by truck category

IPF

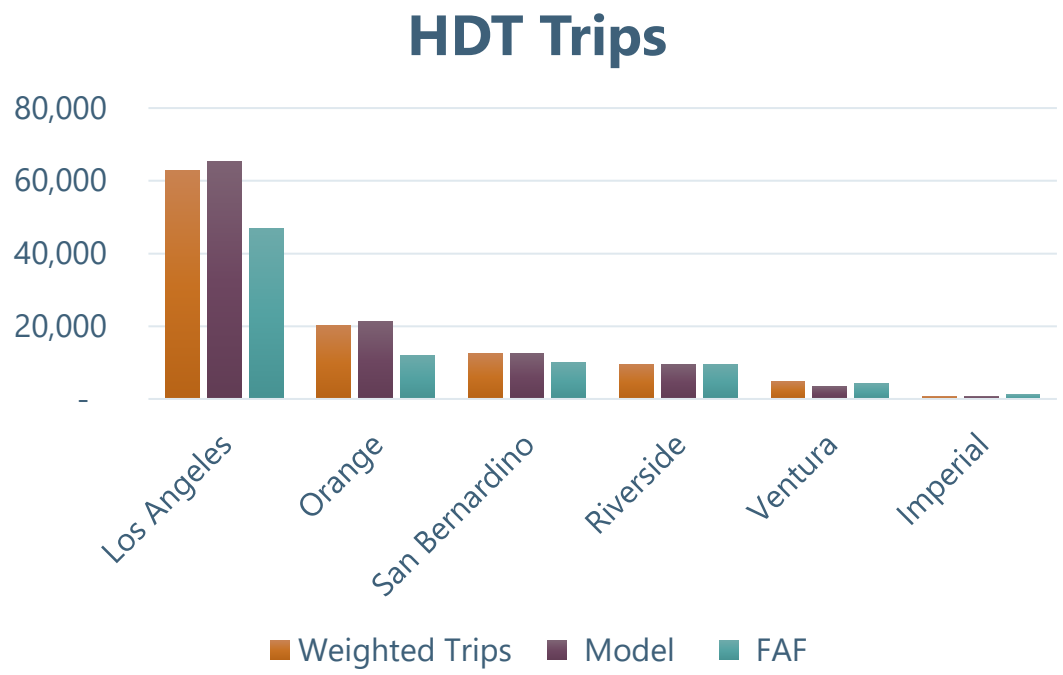
IPF:
Expand Truck GPS trip data to match origin and destination Trip Targets

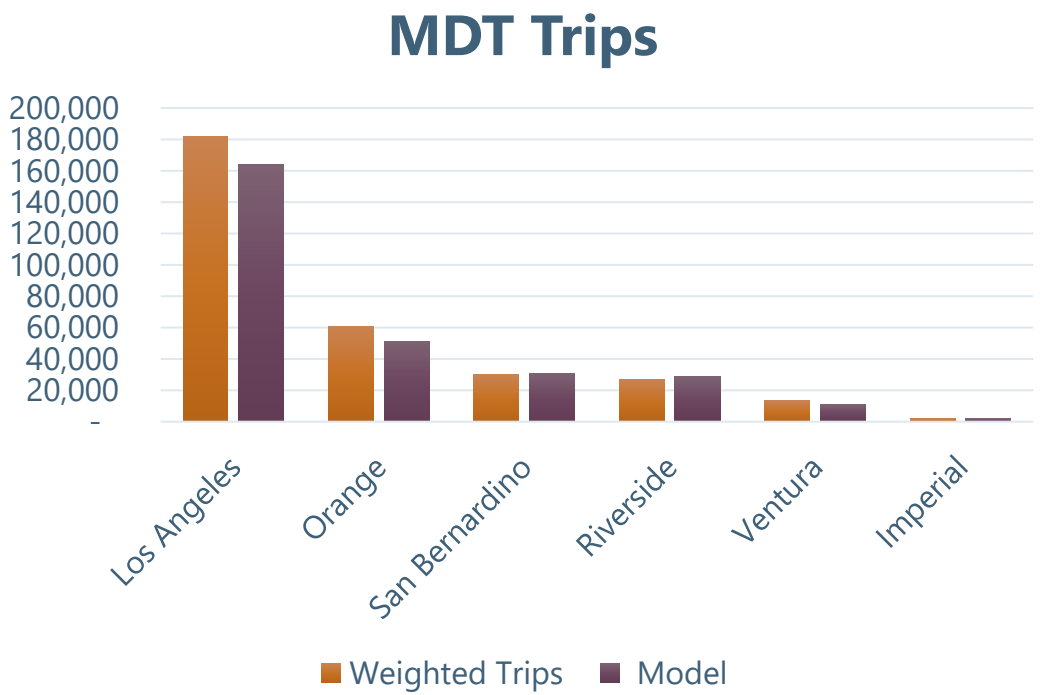
Special Consideration for Electrification:
Generate an average trip weight by combining individual truck trips for each truck travel day

Trip Expansion Validation

-Weighted Trips vs. CSF2TDM Model Trips

SCAG 6-County





Trip Expansion Validation

-Weighted Trips vs. CSF2TDM Model Trips

Assignment Results

Facility Type	Relative Error CSF2TDM	Relative Error Weighted Trips	Relative Error Target	% RMSE CSF2TDM	% RMSE Weighted Trips	% RMSE Target
Freeway	13%	14%	19%	63%	55%	54%
Expressway	28%	5%	32%	119%	94%	200%
Arterials & Collectors	-53%	-58%	52%	145%	127%	200%
Total	**13%**	**10%**	**19%**	**94%**	**81%**	**100%**

Market Segmentation
Daily Activity Patterns

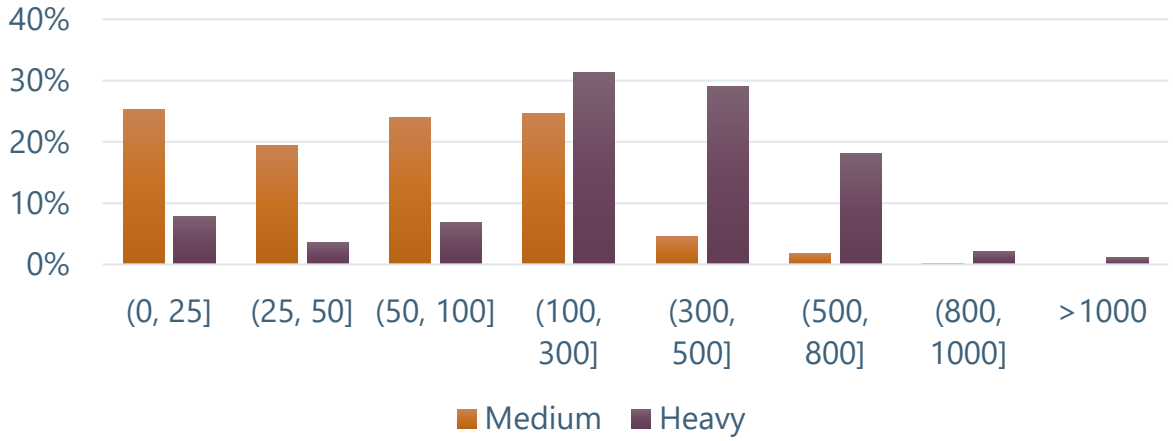
Truck Type

- Port trucks
- Warehouse trucks
- Parking site trucks
- Cross-region trucks

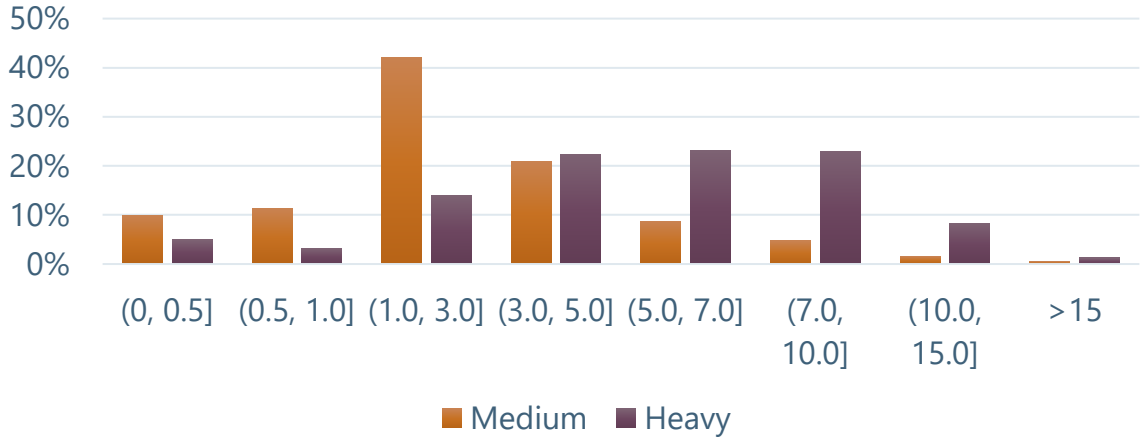
Daily Travel

- Daily trips
- Daily max distance
- Cumulative distance
- Cumulative travel time duration

Cumulative Distance



Cumulative Moving Hours



Payload Allocation

Commodity Flow

Source:
FAF

FAF disaggregation:
Disaggregate from FAF region to county-level

Output:

County-to-county flow (tons) by commodity type and mode. Mostly on HDT.

Payload

Source:
CA-VIUS

Matrices:

Average payload by truck and commodity type

Empty, partial, and fully loaded truck share

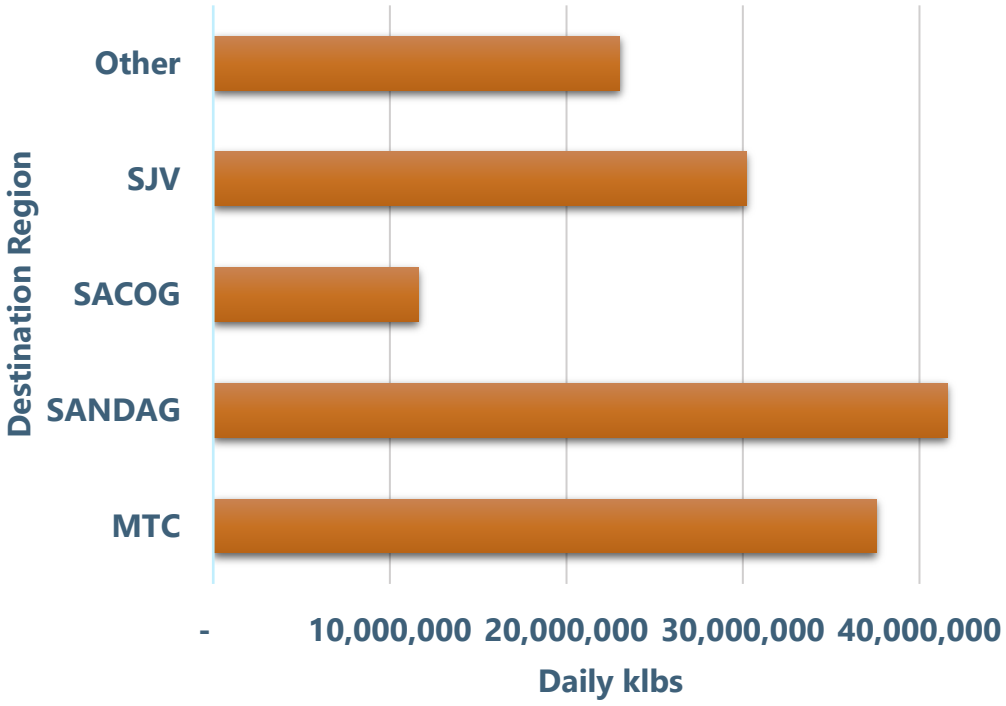
Assign Commodity

Targets
County-to-county commodity flow

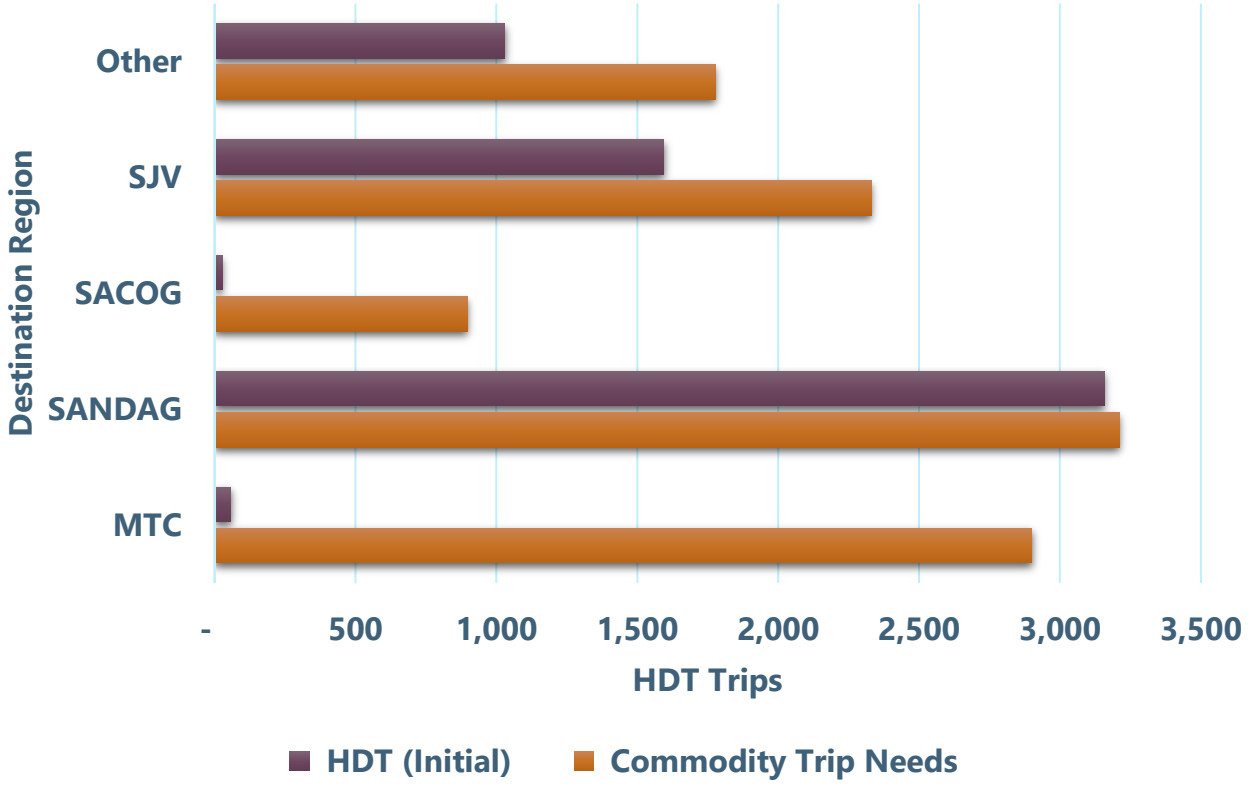
Process
Assign payloads to every weighted trip/linked trips

Commodity/Trip Demand

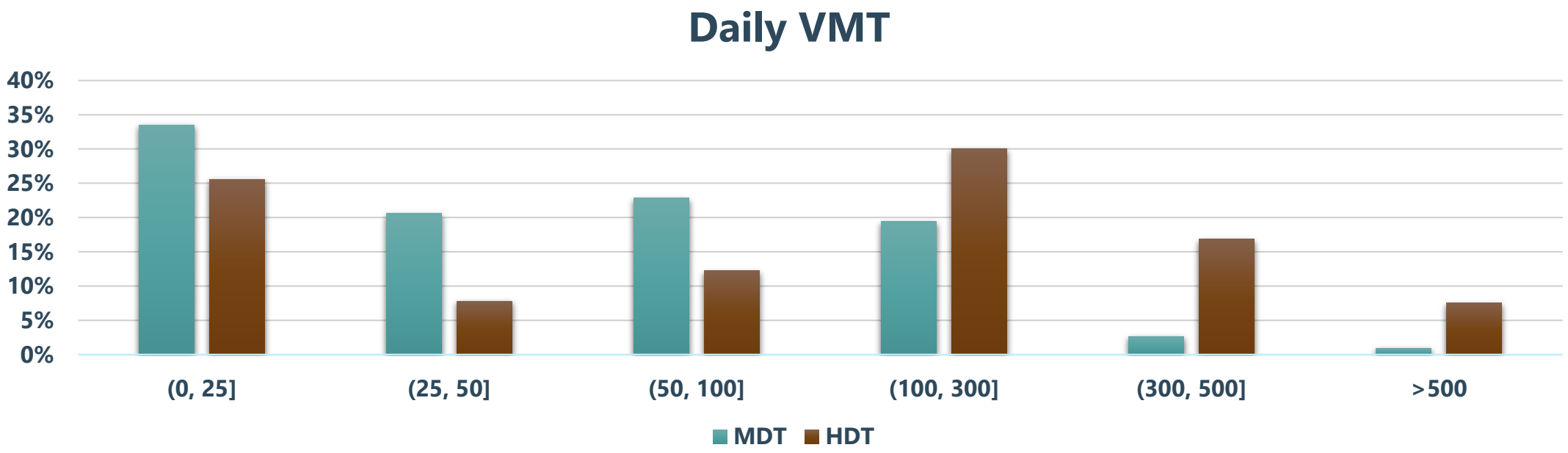
SCAG FAF Commodity Destination



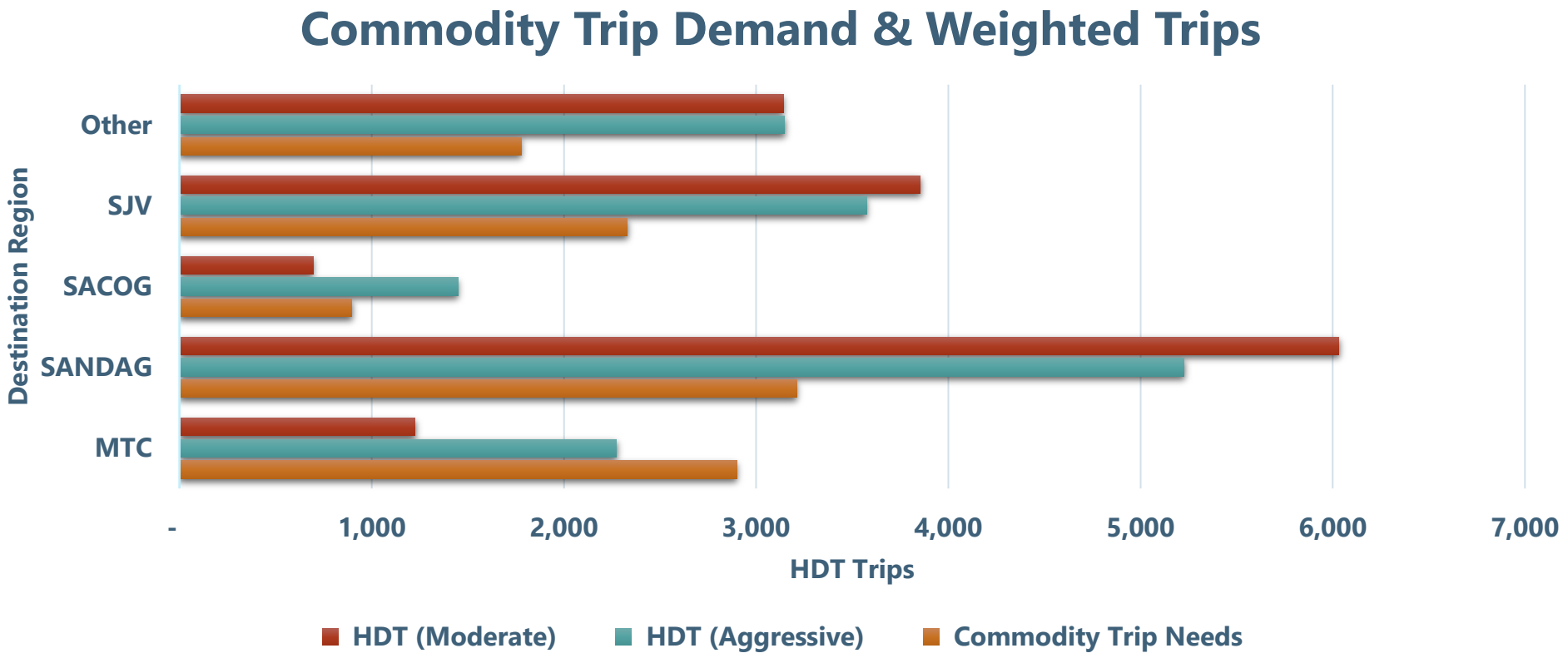
Commodity Trip Demand & Weighted Trips



Daily Activity Patterns



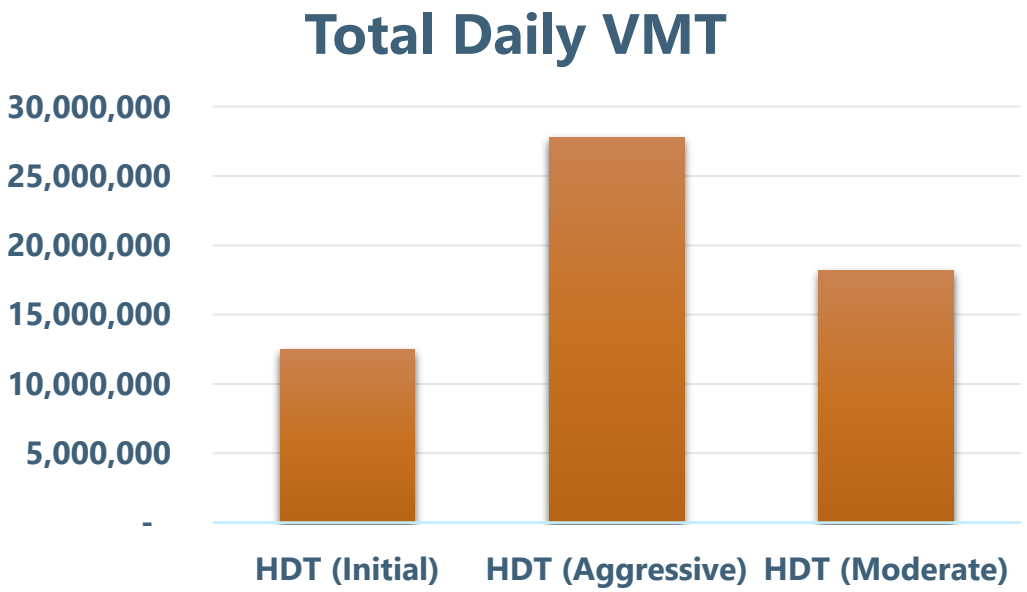
Further Trip Weight Adjustment

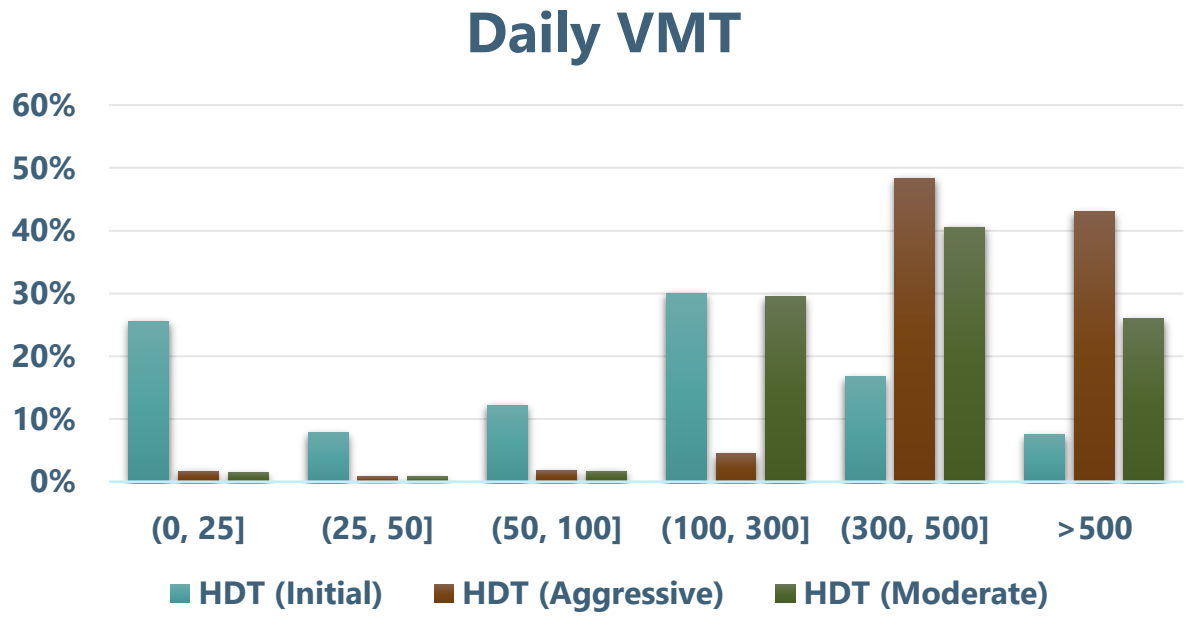


Further Trip Weight Adjustment

-Weighted VMT Results

Initial vs. Aggressive vs. Moderate





INITIAL QUESTIONS?

STAKEHOLDER ENGAGEMENT THEMES

Themes from Outreach and Engagement

- Funding

Themes from Outreach and Engagement

- Funding
- Electrical Grid Capacity and Availability of Hydrogen

Themes from Outreach and Engagement

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- Electrical Grid Capacity and Availability of Hydrogen
- Public vs. Private Depots

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- Timelines

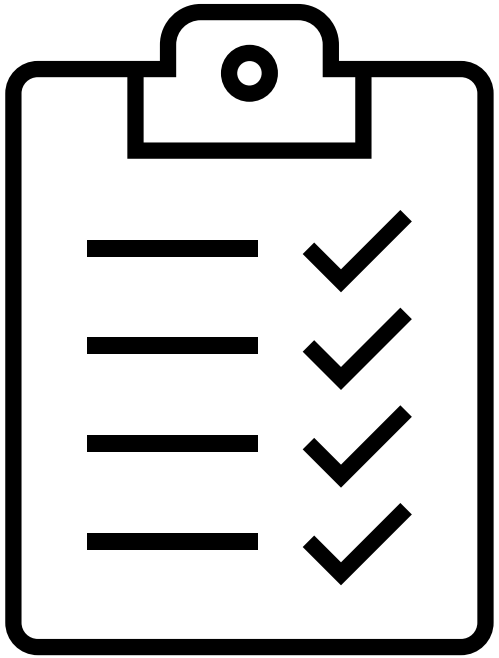
Themes from Outreach and Engagement

- Funding
- Electrical Grid Capacity and Availability of Hydrogen
- Public vs. Private Depots
- Timelines
- Equity of Locations

TAC ENGAGEMENT

Polls

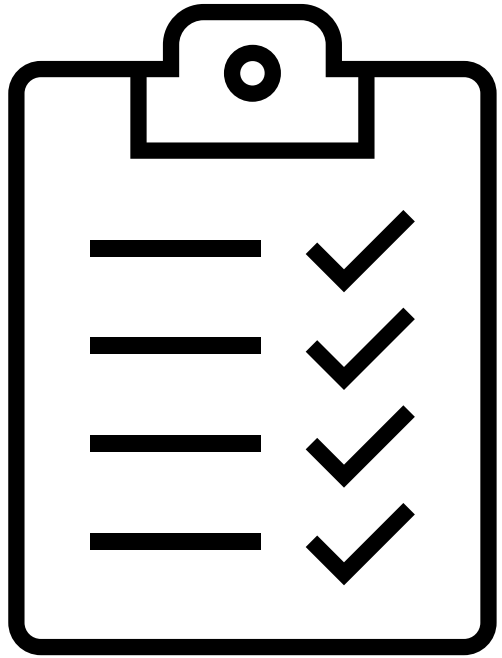
Which of the challenges identified by stakeholders do you think is the biggest concern? *(select one option)*



Polls

Which of the challenges identified by stakeholders do you think is the biggest concern? *(select one option)*

Which of the challenges identified by stakeholders are you or your organization actively working on? *(select all that apply)*



Further discussion of first poll question

Which of the challenges identified by stakeholders do you think is the biggest concern?

Discussion and Q&A

Is there any information from today's presentation that will be helpful for upcoming grants?

What other ongoing efforts and coordination needs should we know about?

Any final questions or comments?

Final Word

How are you feeling after today’s meeting?

Please provide a one word answer in the chat, thank you!

NEXT STEPS

What's Coming Next

- Completing survey, focus group and interviews by end of October 2023
- Continue to convene Technical Advisory Committee, four meetings remaining through June 2024
- Continue to develop HEVI-LOAD charging requirements analysis; develop future year demand forecasts by December 2023
- Finalize Framework and workflow for Model Implementation by January 2024

Contact

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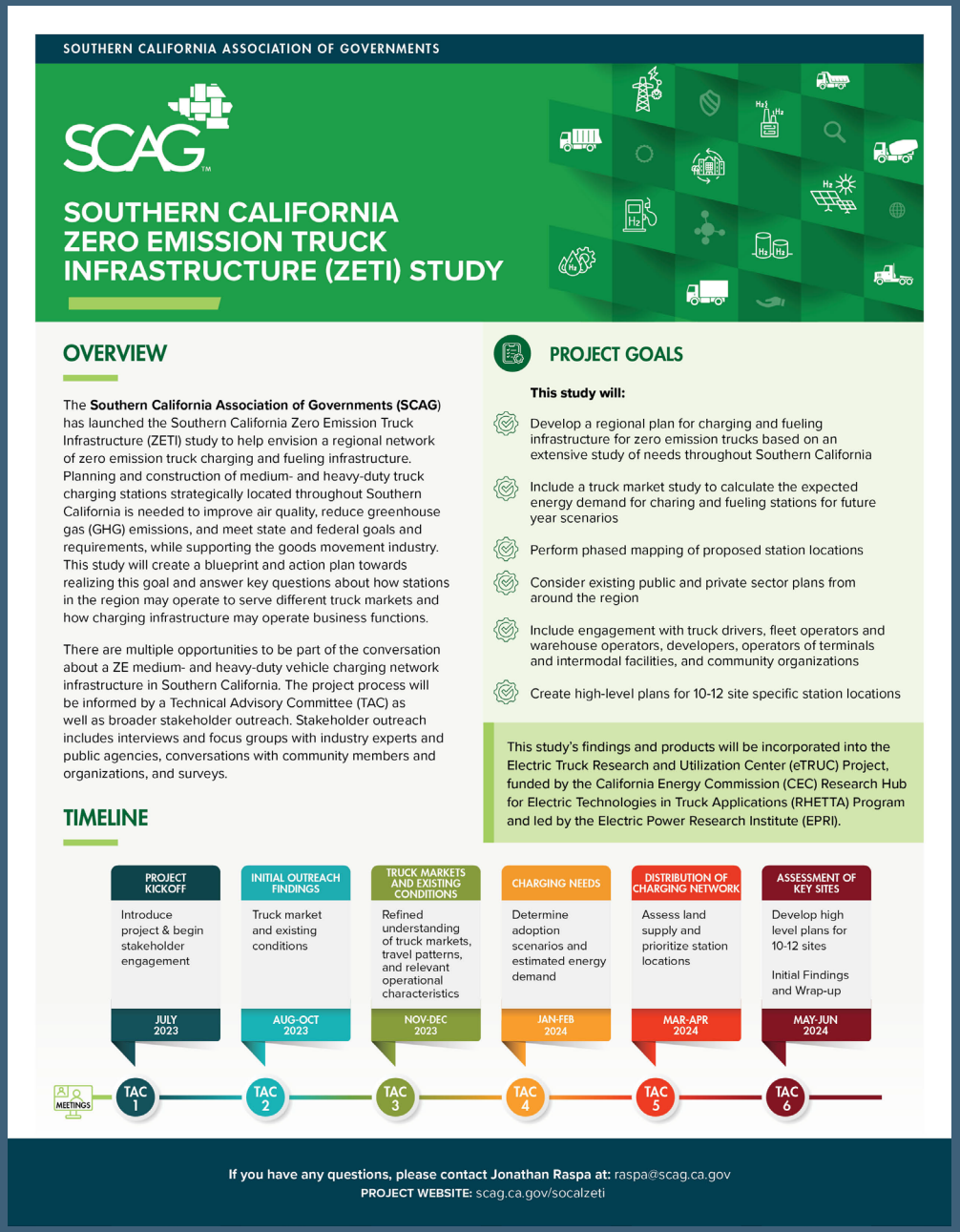
THANK YOU!

For more information, please visit:

https://scag.ca.gov/socalzeti

SCAG-ZETI@cramobility.com



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

SCAG

SOUTHERN CALIFORNIA ZERO EMISSION TRUCK INFRASTRUCTURE (ZETI) STUDY

OVERVIEW

The **Southern California Association of Governments (SCAG)** has launched the Southern California Zero Emission Truck Infrastructure (ZETI) study to help envision a regional network of zero emission truck charging and fueling infrastructure. Planning and construction of medium- and heavy-duty truck charging stations strategically located throughout Southern California is needed to improve air quality, reduce greenhouse gas (GHG) emissions, and meet state and federal goals and requirements, while supporting the goods movement industry. This study will create a blueprint and action plan towards realizing this goal and answer key questions about how stations in the region may operate to serve different truck markets and how charging infrastructure may operate business functions.

There are multiple opportunities to be part of the conversation about a ZE medium- and heavy-duty vehicle charging network infrastructure in Southern California. The project process will be informed by a Technical Advisory Committee (TAC) as well as broader stakeholder outreach. Stakeholder outreach includes interviews and focus groups with industry experts and public agencies, conversations with community members and organizations, and surveys.

PROJECT GOALS

This study will:

- Develop a regional plan for charging and fueling infrastructure for zero emission trucks based on an extensive study of needs throughout Southern California
- Include a truck market study to calculate the expected energy demand for charing and fueling stations for future year scenarios
- Perform phased mapping of proposed station locations
- Consider existing public and private sector plans from around the region
- Include engagement with truck drivers, fleet operators and warehouse operators, developers, operators of terminals and intermodal facilities, and community organizations
- Create high-level plans for 10-12 site specific station locations

This study's findings and products will be incorporated into the Electric Truck Research and Utilization Center (eTRUC) Project, funded by the California Energy Commission (CEC) Research Hub for Electric Technologies in Truck Applications (RHETTA) Program and led by the Electric Power Research Institute (EPRI).

TIMELINE

PROJECT KICKOFF	INITIAL OUTREACH FINDINGS	TRUCK MARKETS AND EXISTING CONDITIONS	CHARGING NEEDS	DISTRIBUTION OF CHARGING NETWORK	ASSESSMENT OF KEY SITES
Introduce project & begin stakeholder engagement	Truck market and existing conditions	Refined understanding of truck markets, travel patterns, and relevant operational characteristics	Determine adoption scenarios and estimated energy demand	Assess land supply and prioritize station locations	Develop high level plans for 10-12 sites Initial Findings and Wrap-up
JULY 2023	AUG-OCT 2023	NOV-DEC 2023	JAN-FEB 2024	MAR-APR 2024	MAY-JUN 2024
MEETINGS: TAC 1	TAC 2	TAC 3	TAC 4	TAC 5	TAC 6

If you have any questions, please contact Jonathan Raspa at: raspa@scag.ca.gov
PROJECT WEBSITE: scag.ca.gov/socalzeti