Transport Refrigeration Unit Regulation
Staff Concept Workshops

August 28, 2019: Fontana
September 3, 2019: Fresno
September 11, 2019: Sacramento
• Introduction & Background
• Health Analyses
• Regulation Concept
• Infrastructure
• Enforcement and Compliance
• Solicitation for Regulatory Alternatives
• Environmental Analysis (CEQA)
• Funding Opportunities
• Next Steps
Introduction
CARB Freight Actions Designed to Meet Multiple Objectives

- Cut community health risk (support AB 617 emission reductions)
- Attain regional air standards (support State Implementation Plan)
- Mitigate climate change (support Scoping Plan and SLCP Plan)
New CARB Freight Actions
(1st Board hearing dates shown)

Zero Emission Requirements

Truck certification ✓
Truck sales requirement
Ships at berth

Locomotive idling
Transport refrigerators

Forklifts

Truck purchase requirements
Drayage trucks
Port & rail yard cargo equipment

2018
Truck GHG ✓
Truck diagnostics ✓
Handbook-1 Warehouses

2019
Handbook-2 Ports, Rail

2020
Truck omnibus: low NOx standards, certification, recall, warranty
Truck I/M
Harbor craft

2021
Low-emission diesel fuel

2022
Non-preempted locomotives

Cleaner Combustion Requirements
Near Source Impact of Transport Refrigeration Units
Background
TRU Types

Truck TRU

Domestic Shipping Container TRU

Trailer TRU

Railcar TRU
TRU Generator Sets
<table>
<thead>
<tr>
<th></th>
<th># TRUs that Operate in CA</th>
<th>Average # TRUs Operating in CA/Day</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NOx (tpy)</td>
</tr>
<tr>
<td>Truck TRU</td>
<td>7,400</td>
<td>7,150</td>
<td>370</td>
</tr>
<tr>
<td>Trailer TRU</td>
<td>166,000</td>
<td>42,600</td>
<td>6,520</td>
</tr>
<tr>
<td>Domestic Shipping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container TRU and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railcar TRU</td>
<td>9,100</td>
<td>1,700</td>
<td>180</td>
</tr>
<tr>
<td>TRU Generator Set</td>
<td>20,600</td>
<td>5,200</td>
<td>210</td>
</tr>
<tr>
<td>Total</td>
<td>203,100</td>
<td>56,700</td>
<td>7,280</td>
</tr>
</tbody>
</table>
Existing TRU Regulation

• Adopted in 2004 (amended in 2010 and 2011)
  • Requires TRU and TRU generator sets to meet in-use performance standards
  • Requires California based units to register with CARB
Statewide PM2.5 Emissions from Transport Refrigeration Units Under the Existing Regulation

![Graph showing PM2.5 emissions from transport refrigeration units over years 2015 to 2040. The graph indicates a significant reduction in emissions, with a steady increase in a certain category over the same period.]

- Truck TRUs
- Trailer TRUs (23-25 Hp)
- Trailer TRUs (Over 25 Hp)
- Domestic Shipping Container and Railcar TRUs
- TRU Generator Sets
Need for New TRU Regulation

• Despite progress made under existing TRU Regulation
  • Elevated health risk to nearby communities
  • SIP attainment (South Coast, San Joaquin Valley)
  • Increase in <25 hp units
  • Does not address refrigerant emissions
• In addition, need to transition to zero-emission to help meet multiple air quality, climate mitigation, and risk reduction goals
## Commercial Availability of Advanced Technology TRUs

<table>
<thead>
<tr>
<th>Technology</th>
<th>Zero-Emission Operation</th>
<th>Full Zero-Emission Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>eTRU</td>
<td>Battery-Electric</td>
</tr>
<tr>
<td>Commercially Available?</td>
<td>Yes, &gt;7,000 units in CA</td>
<td>Yes, ~50 units in CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cryogenic Hydrogen Fuel Cell</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes, ~65 units in CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not yet – in demonstration</td>
</tr>
</tbody>
</table>
Health Analyses
Health Impacts

• **Health Risk Assessment**
  Near source impacts for individual resident and off-site workers around refrigerated warehouses and grocery stores
  - Potential Cancer Risk
  - Noncancer Chronic Health Impacts

• **Regional Analysis**
  Staff will estimate and monetize regional impacts due to emissions from TRU operations
Facility Types

- Cold Storage Warehouses
- Grocery Stores
- Truck Stops
Health Risk Assessment - Overview

Facility Configuration → TRU Emissions → Location/Weather Conditions → Air Dispersion Modeling → Ground Level Concentration of Diesel PM → HEALTH RISK

Cancer ↔ Noncancer Chronic
Potential Cancer Risk – Baseline Cold Storage Warehouse

<table>
<thead>
<tr>
<th>Total Hours of TRU Engine Operation</th>
<th>Downwind Distance (m) from Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Week</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>1500</td>
</tr>
<tr>
<td>8,000</td>
<td>1770</td>
</tr>
<tr>
<td></td>
<td>1140</td>
</tr>
<tr>
<td></td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td>5,000</td>
<td>1110</td>
</tr>
<tr>
<td></td>
<td>710</td>
</tr>
<tr>
<td></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>63</td>
</tr>
<tr>
<td>3,000</td>
<td>670</td>
</tr>
<tr>
<td></td>
<td>430</td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>38</td>
</tr>
<tr>
<td>1,000</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

- When two or more cold storage warehouses operate near one another, the potential cancer risk and the area of exposure significantly increase

Notes:
1. Represents the average risk from three meteorological data sets: Banning, Fresno, Watsonville
2. Residential Receptor. 30-year exposure duration. FAH = 1 for ages less than 16
# Potential Cancer Risk – Baseline Grocery Store

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total Hours of TRU Engine Operation Per Week</th>
<th>Downwind Distance (m) from Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>1 Daily Truck</td>
<td>202</td>
<td>190</td>
</tr>
<tr>
<td>1 Daily Trailer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Seasonal Trailer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Daily Trucks</td>
<td>274</td>
<td>320</td>
</tr>
<tr>
<td>2 Daily Trailers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Seasonal Trailer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Daily Trucks</td>
<td>402</td>
<td>610</td>
</tr>
<tr>
<td>6 Daily Trailers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Seasonal Trailer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Residential Receptor. 30 year exposure duration. FAH: = 1 for ages less than 16
2. Represents the average risk from three meteorological data sets: Banning, Fresno, Watsonville
3. Results includes associated on-site and off-site transiting
Questions or Comments?
Regulation Concept
Concept: Truck TRUs

- Starting in 2022:
  - Register with CARB
  - All newly manufactured use refrigerant with a global warming potential $\leq 2,200$
- Starting in 2025:
  - Fleets phase in full zero-emission at 15% per year (over 7 years)
Concept: Trailer TRUs and Domestic Shipping Container TRUs

• Starting in 2022:
  • Register with CARB
  • All newly manufactured use refrigerant with a global warming potential $\leq 2,200$

• Starting in 2025:
  • Zero-emission operation when parked or stationary for $>15$ minutes at an applicable facility
  • Equipped with electronic telematics system
  • Meet U.S. EPA Tier 4 final emission standards for 25-50 hp engines
Electronic Telematics System (ETS)
Concept: Railcar TRUs

• Starting in 2022:
  • Register with CARB
  • All newly manufactured use refrigerant with a global warming potential ≤ 2,200

• Starting in 2025:
  • Meet U.S. EPA Tier 4 final emission standards for 25-50 hp engines
  • Staff is exploring options for zero-emission operation of railcar TRUs
Concept: TRU Generator Sets

- Starting in 2022:
  - Register with CARB
- Starting in 2025:
  - Zero-emission operation when parked or stationary for >15 minutes at an applicable facility
  - Equipped with electronic telematics system
  - Meet U.S. EPA Tier 4 final emission standards for 25-50 hp engines
## What is an Applicable Facility?

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Proposed Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerated Warehouses and Distribution Centers</td>
<td>&gt;20,000 square feet and has trailer TRU activity</td>
</tr>
<tr>
<td>Grocery Stores</td>
<td>&gt;15,000 square feet and has trailer TRU activity</td>
</tr>
<tr>
<td>Truck Stops</td>
<td>&gt;8 acres (property area)</td>
</tr>
<tr>
<td>Seaports/Intermodal Railyards</td>
<td>All in</td>
</tr>
</tbody>
</table>
Concept: Applicable Facilities

- Starting in 2023, register with CARB and provide geofence information
- Starting in 2024, complete installation of electric charging or fueling infrastructure to support zero-emission operation of TRUs (report available infrastructure type and capacity to CARB)
- Starting in 2025, report or turn away non-compliant TRUs on-site
Concept: Registration Fees

• CARB to collect a TRU and/or applicable facility registration fee to offset program costs
• Frequency and amount to be determined
• Authority – Health and Safety Code Section 43019.1(a)(1)
Questions or Comments?
Infrastructure
Audience Polls
Zero-Emission Infrastructure at Facilities

1. Plan  ➔  2. Design  ➔  3. Install

Complete process can take up to 3 years
Dependent on facility
Step 1. Planning Process

- Technology
- Supply chain
- Costs

**Fuel**
- Determine needs
- Fuel provider coordination

**Scope**
- Site improvements
- Equipment
- Permits

ZE TRU
Step 2. Design Elements

- Identify changes to dock doors and staging area for zero-emission operation
- Specify if utility upgrades will happen off site (upstream of your utility service pole)
- Include site electrical improvement (service pole forward)
Step 2. Design Elements (cont.)

Consider ways to reduce costs:

- Fuel meters for collecting Low Carbon Fuel Standard credits
- Reduce amount of trenching
- Consideration now for future expansion needs
- Energy site management: site generation, storage
- Smart equipment that manages fuel costs
Step 3. Installation Process

Finalize Site Plans → Secure Permits → Utility Coordination

Perform Site Improvements → Install Equipment

ZE Operation
Questions or Comments?
Enforcement and Compliance
Enforcement and Compliance

- Increased Field Inspections
- Fleet and Applicable Facility Audits
- Expanded Registration Requirements
- Electronic Telematics System Requirements
- Applicable Facility Requirements
Questions or Comments?
Solicitation for Regulatory Alternatives
Environmental Analysis (CEQA)
Funding Opportunities
Next Steps
Regulatory Alternatives Solicitation

- Pursuant to SB 617 and the California Environmental Quality Act (CEQA), CARB welcomes public input on alternatives to the regulatory concept for the following:
  - Standardized Regulatory Impact Assessment
  - Environmental Analysis
- CARB encourages public input on alternative approaches that:
  - May yield the same or greater benefits than those associated with the proposed regulation, or
  - May achieve the goals at lower cost
- Please submit alternatives to Lea.Yamashita@arb.ca.gov by October 11, 2019
Environmental Analysis

• Environmental Analysis (EA) to:
  • Analyze potentially significant adverse impacts caused by reasonably foreseeable actions
  • Meet requirements of CARB’s certified program under CEQA
• The CEQA Environmental Checklist (CEQA Guidelines Appendix G) is used to evaluate potential impacts
• The EA will be an appendix to the Staff Report
Environmental Analysis to Include

• Description of reasonably foreseeable actions taken in response to the proposed regulation
• Programmatic level analysis of potential adverse impacts caused by reasonably foreseeable actions
• Beneficial impacts
• Feasible mitigation measures to reduce/avoid significant impacts
• Alternatives analysis

• Input invited at this early stage on appropriate scope and content of the EA
• Draft EA will be released for 45 day public comment period
Funding Opportunities

Funding programs for advanced technology TRUs and supporting infrastructure include:

- **Active**
  - Prop 1B
  - Carl Moyer
  - Low Carbon Fuel Standard (LCFS) Credits
  - Electric Utility Transportation Electrification Programs
  - U.S. EPA Clean Diesel Programs

- **Coming Soon**
  - Clean Off-Road Equipment (CORE) Voucher Incentive Project
  - AB 617 Community Air Protection Incentives
  - California Energy Commission Food Production Investment Program
Next Steps

• Release preliminary Emissions Inventory and Health Analyses Documents in Fall 2019
• Receive public comments on the concept (send to Freight@arb.ca.gov by October 11, 2019)
• Refine concept based on comments received
• Develop draft regulatory language (workshops in early 2020)
• Present Regulation to the Board in late 2020
Additional Information

• New TRU Regulation website: https://www.arb.ca.gov/newTRU

• Contacts:

  Lea Yamashita, Lead Staff
  Lea.Yamashita@arb.ca.gov
  (916) 323-0017

  Cari Anderson, Chief, Freight Transport Branch
  Cari.Anderson@arb.ca.gov
  (916) 324-0247
Questions or Comments?