TOWARD ZERO-EMISSION FREIGHT AT SOUTHERN CALIFORNIA'S PORTS PROSPECTS, PITFALLS & POLICY NEEDS

A UCLA LAW / BERKELEY LAW CONFERENCE SPONSORED BY BANK OF AMERICA

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THE EMMETT INSTITUTE ON CLIMATE CHANGE AND THE ENVIRONMENT



<mark>Inergy Lab,</mark> Flick

KEYNOTE ADDRESS

Mary Nichols Chair, California Air Resources Board

THE EMMETT INSTITU

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PANEL 1 | State of Electrification Technologies Applicable to Goods Movement at the Ports

• Joe Lyou, President and CEO, Coalition for Clean Air; Governor's Appointee, South Coast Air Quality Management District Governing Board

 Renee Moilanen, Manager of Air Quality Practices, Port of Long Beach

 Jimmy O'Dea, Senior Vehicles Analyst, Union of Concerned Scientists

• Cara Horowitz (moderator), Co-Executive Director, UCLA Law Emmett Institute





Panel 1: State of Electrification Technologies Applicable to Goods Movement at the Ports

Joseph K. Lyou, Ph.D.

President & CEO, Coalition for Clean Air

Governor's Appointee, South Coast AQMD Governing Board

@joe_lyou

COALITION FOR



The mission of the Coalition for Clean Air is to protect public health, improve air quality, and prevent climate change.

L.A. Area Needs



45% NOx emission reductions by 2023



55% NOx emission reductions by 2031

Top NOx Sources in 2031



* ~300 largest stationary sources, including refineries & power plants.

TABLE G-2: Statewide Health Effects and Valuation (2013 \$) Associated with Freight Emissions Contributing to PM2.5—Midpoint Projections

| | PM2 5 and NOx | 2012 | 2030 | 2050 |
|---|------------------------|-------|------|-------|
| < | Mortality | 2,200 | 980 | 1,100 |
| | Hospitalizations* | 330 | 150 | 160 |
| | ER Visite [†] | 950 | 420 | 450 |
| < | Valuation (billions) | \$20 | \$9 | \$10 |

* Includes respiratory and cardiovascular hospitalizations.

† Includes asthma and cardiovascular emergency room visits.

TABLE G-3: Statewide Health Effects and Valuation (2013 \$) Associated with Freight Emissions Contributing to PM2.5—Uncertainty Ranges**

| PM2.5 and NOx | 2012 | 2030 | 2050 |
|------------------------|-------------|-----------|-----------|
| Mortality | 1,700-2,700 | 770-1,200 | 830-1,300 |
| Hospitalizations* | 43-770 | 19-340 | 20-370 |
| ER Visits [†] | 600-1,300 | 260-570 | 280-620 |
| Valuation (billions) | \$16-\$24 | \$7-\$11 | \$7-\$12 |

* Includes respiratory and cardiovascular hospitalizations.

**Uncertainty ranges only reflect uncertainty in the concentration-response function, and do not reflect uncertainty in emission projections, spatial interpolation, and aggregation. † Includes asthma and cardiovascular emergency room visits.

Source: State of California, July 2016, California Sustainable Freight Action Plan, p. G-7.

The Path Forward

Deal with our prisoners' dilemma
Be honest and admit shortcomings
Be an effective advocate

Vincent Van Gogh °O° Crows Over the Wheat Field



Market Realist[@]

Source: Encyclopedia Britanica

Near-Zero Emission Advocates





California Voter Views of Clean Air and Clean Vehicle Policies

Key Findings from a Survey of Voters Statewide and in Impacted Communities Conducted March 3-15, 2018



OPINION RESEARCH & STRATEGY

Methodology

- ✓ 638 interviews with registered voters in California
- ✓ Margin of sampling error of ±3.9% at the 95% confidence level
- ✓ Additional oversample in the following regions:
 - CA-99 Corridor: Fresno to Bakersfield within 1.5 miles of the highway (N=209)
 - I-710 Corridor: within 1.5 miles of the highway (N=222)
 - Inland Empire Cities: Chino, Colton, Corona, Fontana, Jurupa Valley, Ontario, Redlands, San Bernardino (N=216)
 - West Oakland (N=206)
- ✓ Margin of sampling error of ± 6.6% to 6.8% at the 95% confidence level for each region
- ✓ Interviews conducted March 3 15, 2018
- ✓ Interviews available on landlines and cell phones in English and Spanish
- ✓ Some percentages may not sum to 100% due to rounding





Respondents were asked about two proposals: switching to zero-emissions vehicles when they are available and near-zero emissions vehicles now.

Some people have said that we should set a goal that, at some specific date in the future, all trucks and heavy-duty vehicles in California should be <u>zero-emission</u> <u>vehicles</u> – meaning waiting until vehicles are available that are powered by electricity or hydrogen that do not create any emissions from the vehicles while they drive.



Some people have said that there are trucks and heavy-duty vehicles that produce far less pollution than the trucks on the road today, and could be put into use by trucking companies and others right away. These are known as "near**zero vehicles**" because they emit 90% less pollution than the cleanest dieselpowered trucks on the road today. These people have suggested we set the goal of switching to near-zero emissions trucks now.



Question: "Does this goal sound like something you would support or oppose?" Questions were rotated.

Two-thirds of respondents statewide support both proposals and fewer than one in ten want a ZEV-only approach.





Question: "Does this goal sound like something you would support or oppose?"

My favorite podcast . . .





Former U.S. Attorney Preet Bahrara

Defense Attorney Ben Brafman



Battery

- Too expensive
- Too heavy
- Limited range
- Limited availability
- Takes a long time to charge
- Lack of charging infrastructure
- Currently relies on fossil fuels



- Hydrogen
- Too expensive
- Very limited availability
- Lack of fueling infrastructure
- Currently relies on fossil fuels

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- More expensive than diesel
- Bad experience with 9L trucks
- Not zero emissions
- Limited fueling infrastructure
- Currently relies on fossil fuels



Electric

attery

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- Battery technology advancements will help with cost, weight, and range issues
- More companies developing trucks and equipment
- Fast charging & opportunity charging being developed
- SB 350 helping address infrastructure needs
- Reduced reliance upon fossil fuels as use of renewable energy increases





- Cost will come down with additional production
- More companies developing trucks and equipment
- Short-term and longterm fueling infrastructure options available
- Reduced reliance upon fossil fuels as use of renewable energy increases



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- Total cost of ownership can be less than diesel with large scale production
 - New 12L trucks are performing well
- Near-zero trucks are as clean as the average car
- Fueling infrastructure will take care of itself if demand is there
- Policies like the Low-Carbon Fuel Standard make renewable natural gas cost competitive



The end.

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Heavy-duty vehicles: The next frontier for electrification

Jimmy O'Dea, Senior Vehicles Analyst

The need for electrification

Heavy-duty vehicles in California...



Diesel particulate matter



Source: US EPA EJSCREEN

California's GHG emissions over time, by fuel



Source: California Air Resources Board, Greenhouse Gas Inventory, 2017.

Concerned Scientists

CO₂ emissions over time from select fuels in California



Source: California Air Resources Board, Greenhouse Gas Inventory, 2017.

Concerned Scientists

Life cycle global warming emissions, e.g. buses



Concerned Scientists

State of technology







Electric trucks are here and coming



92 miles



24 hours



100 miles



200 miles



150 miles



500+ miles



220 miles



500 miles



300 miles

Electric trucks are high performing


Shenzhen



Purchase incentives



VW funds from diesel scandal will pay for zero-emission buses, trucks in California



By RUSS MITCHELL MAY 25. 2018 | 5:25 PM



Charging infrastructure

ELECTRIC VEHICLES

California Regulators Approve Landmark Utility EV-Charging Proposals

"What we're seeing is one of the largest and most well-thought-out approaches to advancing electrification of vehicles."

EMMA FOEHRINGER MERCHANT MAY 31, 2018





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LUNCH BREAK

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Photo credit: Eric Fredericks, Flic

MARUBA ZONDA

LUNCHTIME DISCUSSION Challenges for Zero-Emission Trucking

- Vincent Pellecchia, Strategic Account Manager, BYD Motors
- **Ryan Popple**, Chief Executive Officer, President and Director, ProTerra
- **Daniel Witt**, Senior Manager of Business Development and US Policy, Tesla Motors
- Jordan Diamond (moderator), Executive Director, Center for Law, Energy, and the Environment, UC Berkeley School of Law





PANEL 2 | Financing and Other Implementation Challenges for Zero-Emission Technologies

- Michelle Iturralde, Senior Vice President, Bank of America
- Victor La Rosa, Chief Executive Officer, President & Founder, Total Transportation Services Inc. (TTSI)
- Bryon Rockwell, Managing Director, Western Region Public Finance Bank of America Merrill Lynch
- Chris Shimoda, Vice President of Government Affairs, California Trucking Association
- Ted Lamm (moderator), Climate Law and Policy Fellow, Center for Law, Energy & the Environment at UC Berkeley School of Law



Towards Zero-Emission Freight at Southern California Ports

Financing and Other Implementation Challenges

Chris Shimoda

Vice President, Government Affairs,

California Trucking Association

Who Operates at the Port?

• 97% port fleet operates <100 trucks. Move ³/₄ of all freight.

| | - | | Total Gate | e Moves by | Fleet Size | | | |
|---------------------------|------------------------|--|------------|----------------|---|-------------------------------------|--|--|
| Fleet Size | LMCs | Total Fleet Size ⁸ | | Total Moves | Avg. Number Moves per Fle Size ⁹ | eet Avg. Number of Truck | Avg. Number of Trucks per LMC ¹⁰ | |
| <=20 | 635 | 5,327 | | 55,011 | 10.33 | 8.39 | 8.39 | |
| 21-99 | 223 | 9,345 | | 90,010 | 9.63 | 41.91 | 41.91 | |
| >=100 | 29 | 5,090 | | 53,906 | 10.59 | 175.52 | 175.52 | |
| Total | 887 | 19,762 | | 198,927 | 10.07 | 22.28 | 22.28 | |
| Distribution Flo 3% | n of LMC's eet Size | Truck <=20 <=21-99 <=>=100 6 | 26% | et Size Distri | bution 7% = <=20 = 21-99 = >=100 | Total Moves per Truck Fleet Size | 20 -99 100 | |

Current Fuel/Technology Mix

As of Nov 2017, 97% diesel and 3% LNG/CNG



Current Fuel/Technology Mix

• More than 50% of all moves by 2007-2009 MY Engines



ZEV Deployment Challenges

- Commercial availability
 - Service/Parts
 - Warranties
- Infrastructure
- Cost
- Performance
 - Range
 - Weight

NACFE

Guidance Report:

- **BEVs** have potential
- to better baseline
- diesel performance



Conclusions of NACFE Study

"BEVs will not be a solution for every application or market, but commercial BEVs will have an increasing role in freight transportation in Classes 3 through 8.

The rapid pace of battery energy density improvement will spur increases in BEV efficiency that likely cannot be matched by evolutionary changes to the internal combustion engines.

The transition in specific market segments will be drawn out over decades, sharing space with traditional gasoline, diesel, and other alternative-fuel powertrains and also competing with other emerging technologies like fuel cells and hybrids.

Mixed fleets (including diesel, natural gas, hybrid, and BEV products) optimized for specific routes and duty cycles will likely be the norm through 2050."

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Alternative Fuel Vehicle Program

Victor La Rosa, CEO, President & Founder, TTSI



At TTSI, we are committed to leaving as small a footprint as possible on our precious environment. That's why we are committed to several ecological goals designed to drastically reduce our operational emissions and subsequent environmental pollution. Our goal is to operate a zero emission fleet that services our customers while being a steward to the environment.

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Powered by

Clean Natural Ga



2007 CAAP Announcement

LB News | 08.03.07 | publishers@lbpost.com Coalition Funds Green Trucks

Long Beach Mayor Bob Foster and LA Mayor Antonio Villaraigosa were on hand to support the Clean Trucks Program to address the impact of diesel-related emissions on the surrounding communities by 2012.

The program places truck drivers into environmentally friendly vehicles by providing them with financial support which allows them to remain as independent owner operators.

The program will fund 100 "clean" trucks into service over the next 12 months.

The retail store, Target, has partnered with Total Transportation Services, Inc (TTSI) and NYK Logistics and identified an innovative solution which meets both industry and independent owner/operator needs.

This group, along with other beneficial cargo owners and trucking companies,

has also formed a coalition for the sole purpose of developing and implementing solutions to address the issues of truck emissions. The Coalition for Responsible Transportation will use the framework from TTSI, NYK and Target as a starting point for encouraging discussions and partnership as companies identify possible solutions.





TTSI announced during the press conference that it would convert it's entire fleet to comply with the provisions of the CAAP



The Beginning Pre-Clean Air Action Plan (CAAP)



Prior to the implementation of the CAAP, trucks that transported containers in and out of the port complex were much older trucks with little to no emission standards







Progression to Zero Emissions





TTSI TAKES DELIVERY OF FIRST 8 CLEAN LNG TRUCKS May 22, 2008



From Right: Greg Roche, Shaunt Hartounian & Peter Grace of Clean Energy, Scott Newton - NYK Logistics Kayle Schreiber - TARGET, Vic La Rosa - TTSI, Rick Crawford - NYK Logistics, Russ Schmitz, Inland Kenworth and Kelly Mills - Westport Fuel Systems.





Alternative Fuel Vehicle Demonstrations

| Alternative Fuel Vehicle Type | Manufacturer | Projected Demonstation | Number of Trucks |
|--|----------------------------|---------------------------|---------------------|
| Electric Battery Truck | BYD Motor | April 2018 | 2 |
| Compressed Natural Gas Hybrid (Electric Motor) | CTE/Kenworth | Mid 2018 | 1 |
| Compressed Natural Gas Hybrid (Electric Motor) | Efficient Drive Train | Late 2018 | 2 |
| Compressed Natural Gas Hybrid (Electric Motor) | TransPower | May 2018 | 1 |
| Electric Battery Truck | TransPower | May 2018 | 4 |
| Electric Battery Truck | US Hybrid Corporation | In Progess | 2 |
| Fuel Cell Battery Truck (Hydrogen) | CTE/Kenworth | May 2018 | 1 |
| Fuel Cell Battery Truck (Hydrogen) | Hydrogenics | Late 2018 | 2 |
| Fuel Cell Battery Truck (Hydrogen) | TransPower | May 2018 | 4 |
| Fuel Cell Battery Truck (Hydrogen) | US Hybrid Corporation | Jan 2018 | 1 |
| Liquid Natural Gas Hybrid (Electric Motor) | US Hybrid Corporation | In Progess | 2 |
| Liquid Natural Gas Hybrid (Electric Motor) | US Hybrid Corporation/POLB | Mid 2018 | 4 |
| Repower 12 Liter, Low NOx Engine (LNG) | Cummins/Clean Energy | In Progess | 5 |
| Total | | | 31 |

CTE - Center for Transportation and Environment



Battery Electricity









LNG/CNG Technology









Hydrogen Fuel Cell









Fueling Infrastructure











Electric Truck Chargers





LNG & CNG Fuels





Hydrogen Fueling



Hydrogen Dispensing Equipment



Hydrogen Generation Equipment





(Harbor Performance Enhancement Center)





HPEC - 100 Acres (now)





HPEC - Future



KEYNOTES

- EXISTING CUSTOMS HOUSE HISTORICAL BUILDING
 ADMINISTRATION BUILDING (EXISTING STRUCTURE)
 CELL PHONE HOLDING YARD / BOBTAILS
 TERMINAL ACCESS
 PROPOSED GRADE SEPARATION
 ENTRY / EXIT GATE (4 LANES EACH DIRECTION)
 SECURITY BOOTH
 WHEELED CONTAINER STORAGE, TYP
- (9) CHASSIS POOL (FLEXIBLE)
- (10) POTENTIAL SECONDARY AISLE

LEGEND





For more information on TTSI, please visit our website at: <u>www.tts-i.com</u>

Thank You





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PANEL 3 | Policy Needs to Deploy Zero-Emission Technologies

- Laura Cortez, Community Organizer, East Yard Communities for Environmental Justice
- Veronica Eady, Assistant Executive Officer for Environmental Justice, California Air Resources Board
- Adrian Martinez, Staff Attorney, Earthjustice
- Katie Sloan, Principal Manager Innovation, Development, & Controls, Customer Service Southern California Edison
- Sean Hecht (moderator), Co-Executive Director, UCLA Law Emmett Institute
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