

Electric Goods-Movement Technologies and Equipment

Zero Emissions

Reduced Energy and Operating Costs

Increased Flexibility for California Business



**California
Electric
Transportation
Coalition**

December, 2004

Electric Transportation and Goods-Movement: Many and Diverse Technologies



Electric Technology Benefits

- **Reduced criteria pollutants**
- **Reduced toxic air contaminants**
- **Reduced greenhouse gases**
- **Reduced petroleum dependence**
- **Lower energy costs for consumers**
- **More compliance flexibility for business**
- **Lower compliance costs for business**

Electric Technologies: A Significant Opportunity

- **Electric technologies are an untapped opportunity**
- **Many regulatory and incentive programs either exclude them or undervalue them.**
- **Many electric technologies have significant market share; over 300,000 in California.**
- **Future potential is large, as are benefits to California**

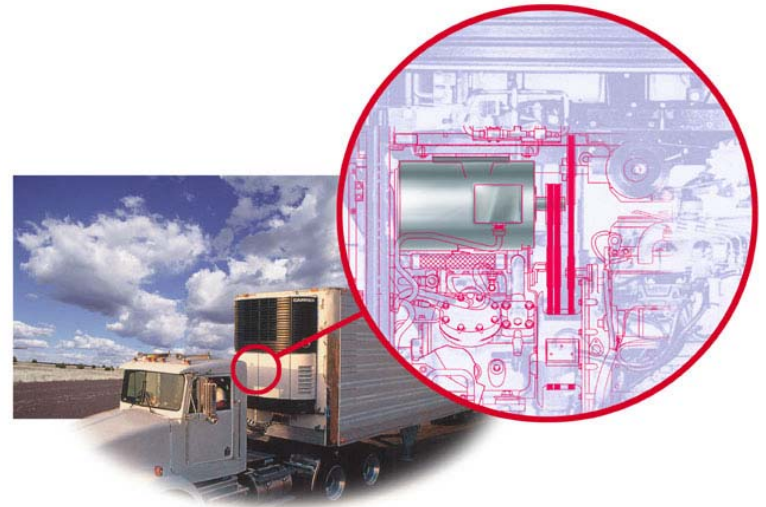
Truck Stop Electrification

- **About 67,000 sleeper cabs in CA**
 - Idle at truck stops up to 16 hours/day
- **The Solution: TSE**
 - Off-board HVAC & electricity
 - Shore power (120v/240v) with onboard HVAC
 - Trucker education for market acceptance
- **2010 Potential**
 - Additional emission reductions: 29.5 tpd NOx and ROG



Electric Transport Refrigeration Units

- e-TRUs plug in at dock, use diesel on road
- About 4,000 – 7000 e-TRUs in California
- As much NOx reduction as an electrified truck stop space
- 2010 Potential
 - Additional emission reductions:
12 tpd NOx and ROG



Marine Terminal Electric Technologies

- **Ship Emissions**
 - One ship = 4 tons pollutants at the dock
 - 16 ships arrive at ports = emissions of 1 million cars
 - Cargo shipment growth = 100% in next 10 years
- **“Cold Ironing”**
 - 3 in Europe; 3 on West Coast
 - Port of LA pending
 - 4 pending studies
- **2010 – 2020 Potential**
 - Additional emission reductions
 - 9 - 27 tpd NOx
 - 14 - 20 tpd SOx



Non-Road ZEVs

- **Electric Lift Trucks**
 - ZEV market share: approx. 60%
 - 70,000 – 90,000 in California today
 - Replacing one ICE lift truck (NO_x) with a ZEV = removing 60 – 170 cars from California roads
- **2010 Potential**
 - Potential additional emissions reductions: 7.5 – 11 tpd NO_x & ROG



Airport Electric Technologies

- Bag tugs, belt loaders, push-back tractors and preconditioned air units
- At airports worldwide
 - Chicago, Denver, Dallas
 - European airports
- At warehouses, tug market is 60% electric
- 2010 Potential
 - Additional emission reductions:
3 – 5 tpd NO_x, ROG



Non-Road ZEVs

- **Burden/Personnel Carriers, Turf Trucks**
 - ZEV market share: 40%
 - 30,000 in California today
- **2010 Potential**
 - Potential additional emissions reductions: 3 tpd NOx and ROG



Bringing it all Together: Potential for California

Electric-Drive Technology	Estimated Reductions in NOx + ROG, 2010 – 2015	Estimated Annual Gallons of Fuel Displaced 2010 – 2015
Truck Stop Electrification	29.5 – 65 tpd	45 – 130 million
Truck Refrigeration Units	12 – 17 tpd	30 – 40 million
Ship to Shore Electrification (cold ironing)	23 – 47 tpd (with SOx)	30 – 65 million
Forklifts	7.5 – 15 tons per day	300 – 540 million
Airport Bag Tugs	3 – 5 tpd	Not calculated
Burden Carriers, Turf Trucks	3 – 4 tpd	60 – 80 million
Sweepers, Scrubbers, Varnishers	2 – 3 tpd	30 – 40 million
Residential lawn and garden equipment	7 - 10 tpd (low estimate)	110 – 275 million
EVs (Buses, NEVs, City Cars)	Not calculated	Not calculated
Plug-in HEVs	Not calculated	300 – 1,200 million
Total	87 – 166 tpd statewide	905 – 2,370 million

PM reductions for the above total 1.9 – 2.4 tpd by 2010 to 2015

What Needs to be Done?

- **Provide Financial Incentives, such as:**
 - Moyer Grant Program, ARB-Air Districts
 - Other Grant or Loan programs
 - Emission Reduction Credits
- **Develop a Transportation Fuel Strategy to Achieve California's Goals.**
- **Count all benefits: NO_x, PM, ROG, CO₂ and fuel diversity.**
- **Allow electric technologies to be included as regulatory compliance options for business.**
- **Reward the additional benefits of electric technologies in the regulatory structure.**

Thank You

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