

I. Our State Should Use EMT Funds To Electrify its Medium Truck Fleets.

Our state should use EMT funds to replace or repower diesel powered medium trucks with electric vehicles, especially if we put them into government fleets. Electric trucks can be a triple win for our state, delivering potential economic, public health, and electricity grid benefits. Switching to electric trucks keeps money in the state, builds in state jobs, saves the owner money, drives massive reductions in NO_x, PM and CO₂, and if done right can even lower electricity rates.¹ Indeed, lifetime fuel and maintenance savings from switching to electric vehicles can amount to more than 22%. Neither diesel nor natural gas can offer all of these benefits.

Electric medium duty trucks (Class 4-6) are widely used and in active service on the road today. With plummeting battery costs, heavy duty and long haul (Class 7 and higher) electric vehicles are already in pilots and on their way to market. Class 4-7 diesel trucks are eligible for EMT funds. These trucks weigh between 14,001 and 33,000 lbs. and include, but are not limited to, delivery trucks, box trucks, beverage distribution trucks, rack trucks, and refuse vehicles.²

A. Electric trucks are already being used by businesses across America.

Staples, Frito-Lay, FedEx, UPS, and Coca-Cola are a few of the private firms that have successfully integrated on-road medium size electric trucks into their fleets. Electric medium trucks are available from Smith Electric, ZeroTruck, Boulder Electric Vehicle, EVI-USA, and Freightliner Customer Chassis Corp.³ These companies offer a number of configurations, primarily for localized/urban (so-called “last mile”) delivery and goods/refuse hauling.⁴ Because of limited battery range --typically a 100 mile maximum—today’s electric medium duty trucks are most effectively deployed in urban or short haul settings.⁵

Larger auto manufacturers are also developing these technologies to meet both growing market demand and environmental regulations. Mercedes recently unveiled its Urban eTruck concept⁶ as well as its first fully electric heavy-duty truck.⁷ Tesla has similarly indicated its

¹ See generally, Electric v. Diesel Factsheet.

² The Partial Consent Decree allows funding for Class 4-7 Local Freight Trucks with model years 1992-2006 unless state regulations already require upgrades to 1992-2006 model years. For a description of truck classes see Oak Ridge National Lab, 2015 Vehicle Technologies Market Report, Chapter 3: Heavy Trucks at 109 available at http://cta.ornl.gov/vtmarketreport/pdf/2015_vtmarketreport_full_doc.pdf.

³ Sean Lyden, *The State of All-Electric Trucks*, Green Fleet, Jan/Feb 2014, 22 available at http://zerotruck.com/wp-content/downloads/GRN_medium.pdf.

⁴ See e.g., ZeroTruck, *Specs*, <http://zerotruck.com/our-fleet/> (last visited Oct. 18, 2016); Smith Electric, *Models and Configurations*, <http://www.smithelectric.com/smith-vehicles/models-and-configurations/> (last visited Oct. 18, 2016); Boulder Electric Vehicle, *Models*, <http://www.boulderev.com/models.php> (last visited Oct. 18, 2016); EVI-USA, *Vehicles*, <http://www.evi-usa.com/PRODUCTS/Vehicles.aspx> (last visited Oct. 18, 2016).

⁵ *Id.*

⁶ Stephen Edelstein, *VW e-Crafter, Mercedes Urban e-truck concept: electric vans for Europe*, Green Car Reports, Sep. 28, 2016 http://www.greencarreports.com/news/1106348_vw-e-crafter-mercedes-urban-e-truck-concept-electric-vans-for-europe.

⁷ Danielle Muoio, *Mercedes-Benz just revealed its first fully electric truck*, Business Insider, Sep. 21, 2016 <http://www.businessinsider.com/mercedes-electric-urban-truck-photos-2016-9>.

intention to apply its all-electric technology to the heavy duty truck market.⁸ Both companies are focusing on larger Class 7/8 Heavy Duty trucks, meaning that the technology may become available within the ten year lifespan of the EMT.

B. Electric trucks save money compared to their diesel counterparts.

Converting to electric medium trucks makes economic sense. A 2013 study placed the total cost savings of electric versus diesel truck ownership at 22%.⁹ That study assumed a cost premium of \$25,000 to \$37,000 for electric compared to diesel trucks. Notably, since that study was published, battery prices have dropped from \$625/kWh, the value used in the study, to under \$200/kWh.¹⁰ Because the up-front cost of an electric truck is significantly influenced by the cost of the battery pack, the study likely understates current lifetime cost savings of switching to electric trucks.

Electric delivery trucks also offer significant savings in fuel and maintenance costs as compared to diesel vehicles. Fuel cost savings from switching to electric trucks are tremendous. For example, diesel costs between \$2-3 per gallon¹¹ and “last mile” diesel vehicles are extremely inefficient: the average fuel economy ranges from 4.6 MPG to 9.6 MPG depending on route characteristics.¹² Electricity prices average approximately \$1.29 per gallon of diesel equivalent, though prices vary by region and electric utility provider. Electric delivery trucks average between 16.7 MPGe and 34.3 MPGe for those same routes.¹³

These improvements in efficiency add up to significant real world savings in fuel and maintenance costs. EVI estimates that the owner of an electric Class 6 truck should expect to spend only \$2,022 per year on electricity while the owner of a similar model diesel vehicle would spend \$6,036 on diesel at current prices. Over a projected ten year lifespan, the cost savings are even greater with an electric vehicle requiring only \$17,901 of electricity versus \$144,632 spent to fuel a diesel truck.¹⁴

Electric trucks also save significant maintenance costs over their lifetime. For example, a diesel “last mile” truck registers maintenance costs around \$.22/mile.¹⁵ These costs include oil changes, break repairs, belt replacements, and regular inspections. An electric delivery truck, by

⁸ Joseph White & Paul Lienert, *Musk ‘master plan’ expands Tesla into trucks, buses and car sharing*, Jul. 20, 2016 <http://www.reuters.com/article/us-tesla-masterplan-idUSKCN1002Q4>.

⁹ Dong-Yeon Lee, et al., *Electric Urban Delivery Trucks: Energy Use, Greenhouse Gas Emissions, and Cost-Effectiveness*, *Environ. Science & Tech.* 47, 8022 (2013).

¹⁰ John Voelcker, *Electric-car battery costs: Tesla \$190 per kwh for pack, GM \$145 for cells*, *Green Car Reports*, Apr. 28, 2016, http://www.greencarreports.com/news/1103667_electric-car-battery-costs-tesla-190-per-kwh-for-pack-gm-145-for-cells. The decreases have not been as significant for larger electric vehicles which rely on a different battery chemistry than electric passenger vehicles. See California Air Resources Board, *Technology Assessment: Medium and Heavy-Duty Battery Electric Trucks and Buses*, Draft, V-3 (Oct. 2015).

¹¹ Average national price as of October 3, 2016 was \$2.389/gallon, but varies greatly with underlying crude oil prices, see <http://www.eia.gov/petroleum/gasdiesel/>.

¹² *Electric Urban Delivery Trucks*, *supra* note 9 at 8027.

¹³ *Id.*

¹⁴ Cost estimates from First Priority GreenFleet assuming national average diesel price of \$2.57/gallon and electricity \$.12/kWh.

¹⁵ *Id.* at 8025.

contrast, costs only \$.056-\$.111/mile.¹⁶ Electric trucks simply have fewer parts to replace and repair. Additionally, electric drive trains and regenerative braking reduce wear and tear on remaining parts like brake pads. Because delivery trucks make frequent stops and travel in congested urban areas, brakes are historically one of the most frequent and expensive costs. With electric drive trains break repairs can be reduced by 20-30%.¹⁷

C. Electric trucks reduce air pollution.

Diesel powered class 4-7 trucks emit, on average, between 4.35 and 7.47 grams of NO_x per mile traveled.¹⁸ Electric vehicles have zero tailpipe emissions. Converting to electricity therefore has a significant impact on local air pollution. Additionally, from a well-to-wheels perspective, electric delivery trucks can reduce greenhouse gas emissions by 27-61%, and they keep improving their environmental performance as our electricity grids get cleaner and cleaner.¹⁹

Lots of pollution from class 4-7 trucks stems from their unique operational requirements. Many of these vehicles register significant idling times, during which they continue to pollute without any additional vehicle miles travelled. A diesel truck uses between .40 and .85 gallons of diesel per hour of idling.²⁰ This costs operators money and contributes to air pollution. To address this issue from long-haul trucks states have electrified truck stops.²¹ However, this has not addressed the issue of idling in the local freight and parcel delivery fleets. It is important to address these emissions because they have a tendency to occur in populated urban and suburban settings. Electric vehicles can idle without emitting, and have more efficient start-up/shut-down abilities that may further reduce the need to idle.

D. The VW settlement “EMT” funds can be used to realize the benefits of electric trucks.

EMT funds are available for 100% of the cost of repowering or replacing government owned vehicles with all-electric motors and charging infrastructure.²² Private owners can receive up to 75% of the cost of an electric repower or replacement. However, private owners can receive funds covering only 40% of the cost of repowering with alternative fuels, and only 25% of the cost of replacing with new alternative fuel or new diesel vehicles. The life time cost savings from investing in electric trucks means that using EMT funds for the up-front cost of these vehicles can actually reduce long-term operating and maintenance expenses, freeing up budget space for additional investment in electric vehicles.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ U.S. EPA Office of Transportation and Air Quality, *Average In-Use Emissions from Heavy-Duty Trucks*, Oct. 2008, 5 <https://www3.epa.gov/otaq/consumer/420f08027.pdf>.

¹⁹ Electric Urban Delivery Trucks, *supra* note 9 at 8028-29. This variation depends on the operational characteristics of the diesel truck being replaced. If a diesel truck runs a small route and uses less fuel/day then there are less GHGs to reduce. *Id.*

²⁰ Oak Ridge National Lab, 2015 Vehicle Technologies Market Report, Chapter 3: Heavy Trucks at 123 available at http://cta.ornl.gov/vtmarketreport/pdf/2015_vtmarketreport_full_doc.pdf.

²¹ *Id.* at 124.

²² Partial Consent Decree, *In re: Volkswagen “Clean Diesel” Marketing, Sales, Practices, and Products Liability Litigation*, Case No.: MDL No. 2672 CRB (JSC) at Appendix D-2 (N.D. Cal. June 28, 2016).