I. Our State Should Invest EMT Funds To Electrify Our Transportation Sector And Not To Double Down On More Diesel and Natural Gas

It is in our state's best interest to use funds from the Environmental Mitigation Trust ("EMT") to advance the electrification of the transportation sector. As discussed below, electrification of the transportation sector can: a) keep our money in-state and save all of us--our residents, schools, governments and businesses--money on transportation fuel; b) save all of us money through lower electricity rates; c) create in-state jobs; d) drastically reduce NOx, smog, and greenhouse gas levels to protect our health and our environmental justice communities; and e) drastically reduce CO_2 emissions.

EMT funds can be used to advance electrification of the transport sector by overcoming several hurdles to electrification. Chief among these hurdles are the higher upfront costs of EVs and the higher upfront costs and difficulty of installing EV charging infrastructure. As the International Energy Agency has explained: "[e]lectric-drive vehicles are unlikely to succeed in the next five to ten years without strong policy support, especially in two areas: making vehicles cost competitive with today's internal combustion engine (ICE) vehicles, and ensuring adequate recharging infrastructure is in place."[1] Likewise, the investment bank UBS just recently concluded that "[p]urchase incentives will remain essential . . . in particular in the US."[2]

As discussed below, EMT funds can and should be used to lower the upfront costs of purchasing electric vehicles such as transit and school buses and trucks, and to build out the charging infrastructure for electric vehicles. While the EMT funds do allow investments in diesel and natural gas projects, neither of these provide nearly the same benefits to our state that electrification will, and both will prolong our dangerous dependence on fossil fuels, including foreign oil.

A. Our State Should Invest EMT Funds In Electric Transportation To Keep Money In Our State's Economy And Save Our Residents Money: We Make Electricity In-State And It Is Reliably Cheaper Than Fossil Fuels

At a national level, in 2015, the United States consumed a total of 7.08 billion barrels of petroleum products, an average of about 19.4 million barrels per day. As reflected in the table below, our state spends an enormous amount of our hard earned money to purchase fossil fuels. [3]

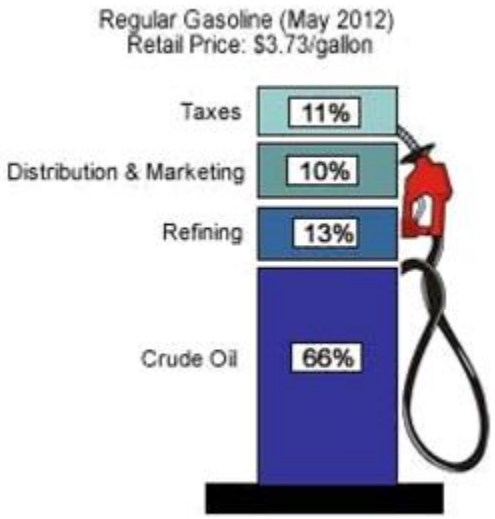
[1] International Energy Agency, "Technology Roadmap: Electric and Plug-in Hybrid Electric Vehicles," June 2011, available at: http://www.iea.org/publications/freepublications/publication/EV_PHEV_Roadmap.pdf

[2] UBS Report. See also, National Academy of Sciences ("federal financial incentives to purchase PEVs should continue . . . .").

[3] U.S. Energy Information Administration. (2016) "How much oil is consumed in the United States?" available at: https://www.eia.gov/tools/faqs/faq.cfm?id=33&t=6

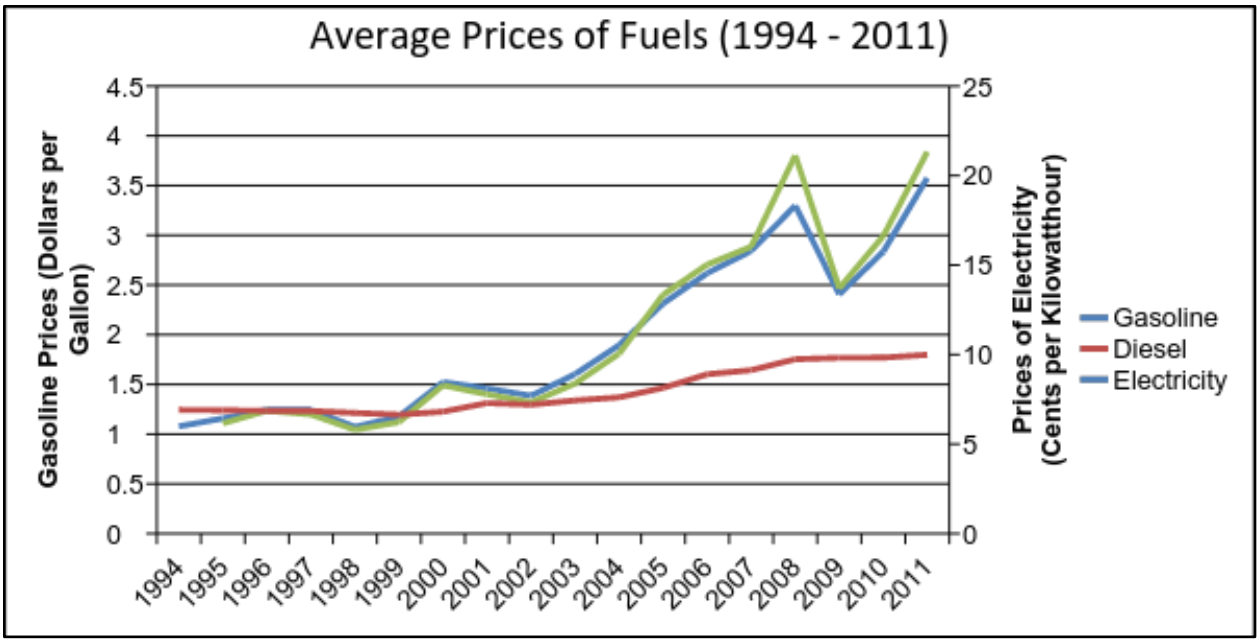
$ Spent on Transportation Petroleum by State			
Alabama	$ 171,400,000.00	Montana	$ 74,600,000.00
Alaska	$ 53,300,000.00	Nebraska	$ 122,400,000.00
Arizona	$ 150,100,000.00	Nevada	$ 38,700,000.00
Arkansas	$ 150,500,000.00	New Hampshire	$ 23,400,000.00
California	$ 1,013,400,000.00	New Jersey	$ 251,700,000.00
Colorado	$ 147,900,000.00	New Mexico	$ 78,700,000.00
Connecticut	$ 86,800,000.00	New York	$ 366,100,000.00
Delaware	$ 32,600,000.00	North Carolina	$ 225,700,000.00
Florida	$ 340,900,000.00	North Dakota	$ 57,600,000.00
Georgia	$ 229,200,000.00	Ohio	$ 492,800,000.00
Hawaii	$ 29,500,000.00	Oklahoma	$ 267,900,000.00
Idaho	$ 56,600,000.00	Oregon	$ 191,900,000.00
Illinois	$ 516,400,000.00	Pennsylvania	$ 453,700,000.00
Indiana	$ 241,800,000.00	Rhode Island	$ 24,700,000.00
Iowa	$ 182,200,000.00	South Carolina	$ 95,600,000.00
Kansas	$ 210,800,000.00	South Dakota	$ 57,500,000.00
Kentucky	$ 177,700,000.00	Tennessee	$ 235,700,000.00
Louisiana	$ 251,300,000.00	Texas	$ 712,200,000.00
Maine	$ 46,600,000.00	Utah	$ 75,100,000.00
Maryland	$ 111,600,000.00	Vermont	$ 18,000,000.00
Massachusetts	$ 166,900,000.00	Virginia	$ 192,900,000.00
Michigan	$ 503,400,000.00	Washington	$ 179,400,000.00
Minnesota	$ 277,800,000.00	West Virginia	$ 85,500,000.00
Mississippi	$ 113,800,000.00	Wisconsin	$ 184,200,000.00
Missouri	$ 322,100,000.00	Wyoming	$ 55,400,000.00

Our state, like nearly every state in the country, generates much of its own electricity, and can readily adopt policies to increase the amount of in state electricity generation. (See: http://www.eia.gov/electricity/state/) Switching from oil, which is a global commodity and whose price fluctuates greatly according to prices set by global markets and multinational corporations, to using home grown electricity, which we do or can generate in our state, will keep this money in our economy rather than sending it to other states and foreign countries. As the US Energy Information Agency ("EIA") has concluded, the great majority of money spent on petroleum products for transportation -- approximately 80% depending upon the cost of oil at the time--are spent on crude and refineries.



Electrifying our transportation will also save our residents money on fuel costs. It is far cheaper to fuel a vehicle with electricity than with oil, or even natural gas. As the US Department of Energy ("USDOE") explains, using gasoline as a surrogate, "[o]n average, it costs about half as much to drive an electric vehicle" in terms of cost per gallon of gasoline versus the cost per "gallon equivalent" of electricity. As of September 30, 2016, when prices were low, USDOE calculated that on a national average, it cost $2.23 for a gallon of gasoline versus $1.16 for an "e-gallon" of electricity. (See: http://energy.gov/maps/egallon) State specific data is available.

Furthermore, the price volatility of fossil fuels is notorious and subjects our residents and businesses to expected fluctuations in the costs of living and conducting business. In comparison, electricity prices are highly stable and consistent over time. This is evident in the graph below comparing the fluctuating cost of diesel versus electricity since 2008, using data from the EIA.



Using the EMT funds to advance transportation electrification therefore keeps our hard earned money in state. It leads to lower fuel costs for our residents and businesses. And it will help protect them from the price shocks that come from fossil fuel price volatility. Transportation electrification is in the best interest of our state, our residents, and our businesses.

B. Our State Should Invest EMT Funds In Electric Transportation To Place Downward Pressure on Electricity Rates

Not only can electrification of the transportation sector save our residents and businesses money on transportation fuel costs, it can also place downward pressure on electricity rates for all utility customers, whether or not they own electric vehicles. Electric vehicle charging will increase electricity sales, which if well integrated into the electric power system can dilute the fixed costs of electricity transmission and distribution and lower electricity rates for all utility customers.[4]

Imagine: vehicles are used for transportation during only a small fraction of the day, and therefore an EV can be charged nearly any time. Our electricity grid – from the poles and wires to the power plants – is designed for the heaviest electricity demands, which rarely occur. If vehicle charging is managed to occur during off-peak periods (when the electric grid is underutilized and there is plenty of spare capacity in the generation, transmission, and

[4] *See, e.g.*, Rocky Mountain Institute, *Electric Vehicles as Distributed Energy Resources* at 19 (2016); Natural Resources Defense Council, *Driving Out Pollution*: *How Utilities can Accelerate the Market for Electric Vehicles* at 10 (2016); Regulatory Assistance Project, *In the Drivers Seat: How Utilities and Consumers Can Benefit From the Shift to Electric Vehicles* at 5, 13 (April 2015); CAISO, *California Vehicle-Grid Integration (VGI) Roadmap: Enabling Vehicle-Based Grid Services* at 5; ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase I* at 38 (2014); ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase II* at 55-70 (2014).

distribution system) this new load can be served by existing and often underutilized infrastructure without proportionally increasing a utility's costs. In turn, this can reduce the average cost of power for all utility customers. Similarly, EV load can be shifted to facilitate the integration of variable generation from renewable sources.[5] By managing EV charging to match electricity demand with renewable generation, we can stabilize power flows and reduce the average cost of power.

Analysis performed by the Pacific Northwest National Laboratory shows that large numbers of EVs charging during off-peak hours could significantly lower the marginal cost of energy.[6] The same analysis found that there is sufficient spare generation capacity in the nation's electric grid to power nearly the entire light-duty passenger fleet if vehicle load is integrated during off-peak hours and at lower power levels.[7]

C. Our State Should Invest EMT Funds In Electric Transportation To Create In-State Jobs

To electrify our transportation sector, we will have to build out our charging network and other assets. Doing so creates well-paying construction jobs. For example, NRG estimated that just its initial buildout of charging infrastructure in California would generate 1,500 in-state jobs.[8] NRG expects that its $102.5 million investment to build electric vehicle (EV) charging infrastructure in California will also "create a gross output of more than $185 million when the employment and procurement of goods and services are factored together, equating to an additional $83.3 million in indirect economic activity by 2016." [9] As Terry O'Day, NRG Director of California Business Development, explained, the project will "build out the California EV infrastructure . . . while also contributing to the California economy through job creation and infrastructure spending."[10]

Similarly, a study conducted at the University of California, Berkeley, also estimates that, as compared to baseline, nearly 100,000 net jobs could be created by 2030 in California from EV infrastructure development--depending on how quickly EV adoption ramps up. This is after accounting for resulting slowed job growth in the fossil fuel industry.

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[5] Regulatory Assistance Project, *In the Drivers Seat: How Utilities and Consumers Can Benefit From the Shift to Electric Vehicles* at 5, 13 (April 2015); CAISO, *California Vehicle-Grid Integration (VGI) Roadmap: Enabling Vehicle-Based Grid Services* at 5. (2014).

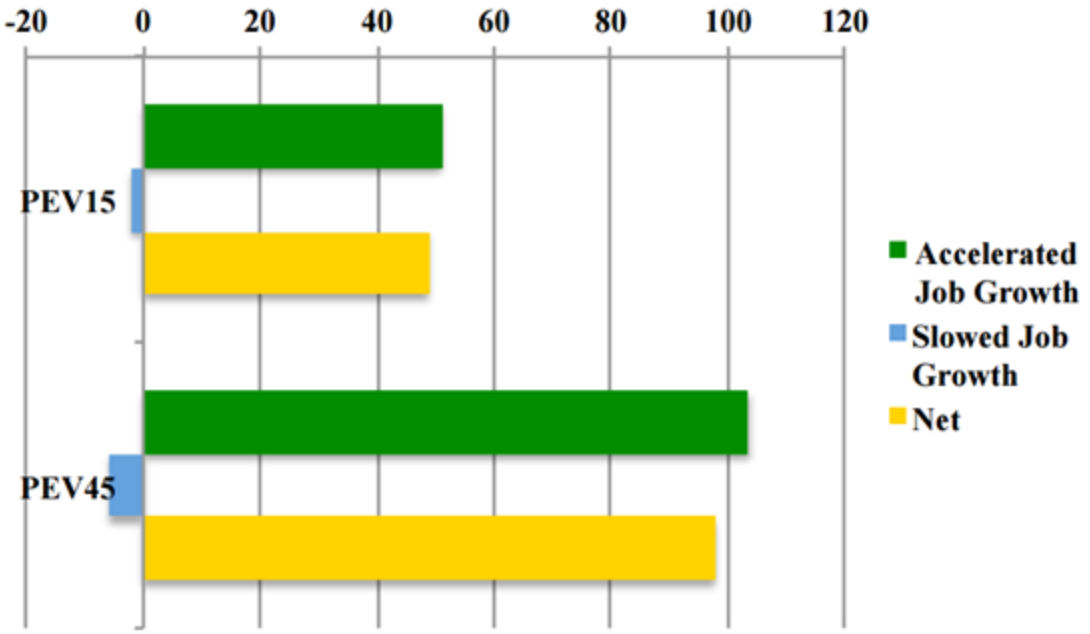
[6] Michael Kintner-Meyer, Kevin Schneider, & Robert Pratt, *Impacts Assessment of Plug-in Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids*, November, 2007.

[7] *Id.*

[8] EVgo. (2012) *NRG Investment in California EV Charging Stations to Create More Than 1,500 Local Jobs*. < https://www.nrgevgo.com/about/news/nrg-investment-in-california-ev-charging-stations-to-create-more-than-1500-local-jobs/ >

[9] Id.

[10] Id.



Source: Authors' estimates.
Note: Results are changes from Baseline values in 2030. Jobs in 1,000s of FTE workers.

"PEV Employment Impacts" Figure taken from David Roland-Holst (2012) Plug-in Electric Vehicle Deployment in California: An Economic Assessment, Department of Agricultural and Resource Economics, UC Berkeley.

Jobs are also created as people are needed to manufacture the charging equipment itself. Rocky Mountain Institute reports that EnerDel added 1,400 jobs at its Indiana- based EV lithium-ion battery plant and plans to add another 3,000 to meet growing demand.[11] California-based charging station manufacturers Coulomb Technologies has grown from two to 100 jobs over the early stages of vehicle electrification efforts, according to a company representative.[12]

The Electrification Coalition ("EC") expects large-scale EV deployment will lead to 1.9 million additional American jobs by 2030 if we make a significant transition from gas-powered cars to EVs. Meanwhile, Rocky Mountain Institute and its affiliates polled 20 utilities, cities, automakers and others on the frontline. Respondents strongly agree that "[v]ehicle electrification efforts in my area have been responsible for creating new jobs."[13]

[11] Mattila, M., Bellew, J.L. (2011) "Do EVs Create Jobs and Improve the Economy?" Rocky Mountain Institute; http://www.rmi.org/DoEVsCreateJobsImproveEconomy
[12] Id.
[13] Id.

D. Our State Should Invest EMT Funds In Electric Transportation To Reduce Smog And Other Pollutants And Deliver Critical Public Health Benefits To All Our Residents—But Especially To Our Environmental Justice Communities

Transportation plays a significant role in driving unsafe levels of smog and other pollution that adversely affects our health. A 2013 MIT study found that, of all sectors, the transportation sector was the greatest contributor to premature emissions–related deaths in the U.S., resulting in 53,000 early deaths per year from vehicle tailpipe emissions.[14]

NOx emissions—which come in significant part from burning fossil fuels in vehicles--is one of the core ingredients of ozone, also known as smog. Indeed, the VW scandal is such a significant public health issue precisely because of the high levels of smog forming NOx emissions that VW's vehicles unlawfully emit. And that is why reducing NOx emissions is at the heart of the VW settlement agreement and the EMT.

Smog—also known as ozone—is a highly reactive gas that inflames people's lungs, impairing breathing and triggering asthma attacks. In 2015, EPA lowered the national ambient air quality standard (NAAQS) for smog to 70 ppb, though there is a significant body of data indicating that smog can be very harmful, especially to children and asthmatics, even at 70 ppb. For example, EPA's Children's Health Protection Advisory Committee concluded that a 70 ppb standard "will not . . . protect children's health,"[15] much as EPA's Clean Air Scientific Advisory Committee concluded that at 70 ppb there is "substantial scientific evidence of adverse effects"[16] and "significant concern, especially for children, asthmatics, the elderly and other at risk populations."[17]

Smog is not directly emitted but is formed by interactions of NOx and volatile organic compounds in the atmosphere. Nationwide, on road vehicles are responsible for approximately 37% of the country's NOx emissions.[18] In states with significant smog issues, mobile sources are often responsible for between 40-50% of the NOx smog precursors. In Arizona, California, Maryland, New York, Connecticut, and New Jersey, all states with air quality monitors showing repeated violations of the 70 ppb smog standard, mobile on-road sources are responsible for between 40 and 53% of in state NOx emissions.[19]

Smog levels are typically highest in urban areas—precisely the areas with the densest populations and thus the most significant public health impacts. Eliminating the tailpipe nitrogen oxide emissions from the transportation sector will drastically reduce smog levels in cities.

Sierra Club retained Sonoma Technology to conduct air quality modeling to understand the contribution of the passenger vehicle fleet to observed ozone levels, which provides

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[14] Massachusetts Institute of Technology Laboratory for Aviation and the Environment (2013) Air Pollution Causes 200,000 early deaths each year in the U.S. http://lae.mit.edu/air-pollution-causes-200000-early-deaths-each-year-in-the-u-s/

[15] Letter from CHPAC Chair Dr.Sheela Sathyanarayana to CASAC Chair Dr. Christopher Frey, May 19, 2014.

[16] Letter from CASAC Chair Dr. H. Christopher Frey to U.S. EPA Administrator Gina McCarthy re: Second Draft Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards (EPA-CASAC-14-004), ii, June 26, 2014.

[17] *Id.* at 28.

[18] National Emissions Inventory 2011, available at: http://www.epa.gov/ttnchie1/net/2011inventory.html

[19] *Id.*

significant information about the magnitude of the air quality benefit achievable through electrification of the vehicle fleet. The results, which were based on EPA's most recent 2011 ozone modeling platform, were stunning. The transportation sector and its attendant nitrogen oxide emissions by themselves can account for nearly all of the exceedances of the current 70 ppb standard in the cities that were analyzed.

Metropolitan areas with highest smog levels[20]	**Population**[21]	**Number of Unique 70+ ppb Days Recorded in the Area (2011)**	**Number of Unique 70+ Days in the Area, Eliminating Regional**[22] **On-Road Vehicle Contributions (2011)**	**Highest Modeled Ozone Levels, Eliminating Regional On-Road Vehicle Contributions (ppb) (2011)**
Bridgeport-Stamford-Norwalk, CT	945,438	19	0	69
Chicago-Naperville-Joliet, IL-IN-WI	9,554,598	21	4	91
St. Louis, MO-IL	2,806,207	44	0	66
Baltimore-Towson, MD	2,785,874	35	0	65
Detroit-Warren-Livonia, MI	4,296,611	20	0	61
Grand Rapids-Wyoming, MI	1,027,703	8	0	59
New York-Northern New Jersey-Long Island, NY-NJ-PA[23]	20,092,883	28	0	69
Trenton-Ewing, NJ	371,537	13	0	61
Columbus, OH	1,994,536	22	0	57
Cleveland-Elyria, Mentor, OH	2,063,598	21	1	93
Pittsburgh, PA	2,355,968	23	0	67
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,051,170	28	0	65

Indeed, for precisely this reason, the California Air Resources Board (CARB) concluded that attainment of the ozone standard would be significantly dependent on reducing nitrogen oxide emissions from the vehicle sector. More specifically, CARB concluded that complying

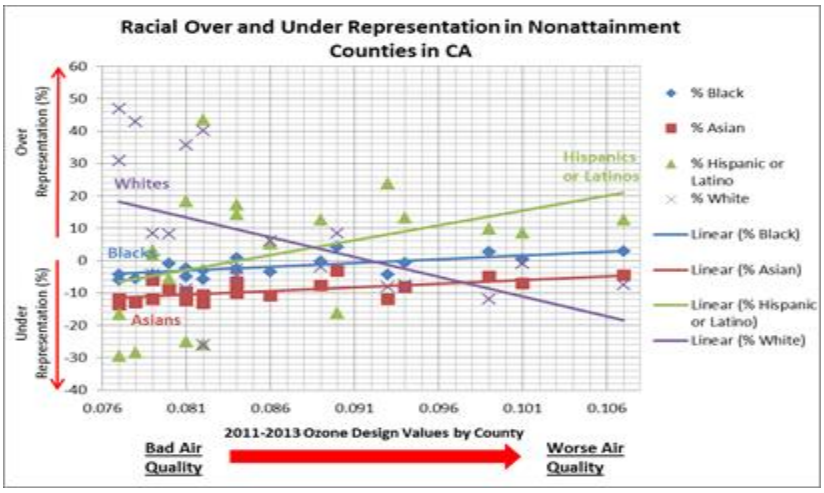
[20] These metropolitan areas are Core-based Statistical Areas ("CBSAs") and Combined Statistical Areas ("CSAs").
[21] US Census Bureau, available at: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
[22] "Regional on-road vehicle contributions" include the on-road mobile fleets of the following states: CT, DC, IL, IN, MD, MI, NJ, NY, OH, PA VA, WV, DE.
[23] EPA and the US Census Bureau also call this: "New York-Newark-Jersey City, NY-NJ-PA."

with the 2008 ozone NAAQS of 75 ppb will require "nearly complete transformation of passenger vehicles to zero-emission technologies."[24]

As the above table reflects, the benefits of reducing NOx emissions, and thus smog, by electrifying our transportation sector flows in significant part to environmental justice communities. Notably, reducing pollutant load in environmental justice communities is a core criteria for approving a state's plan for EMT funding. As section 5.2.10 of the Settlement Agreement provides, in approving plans, states must provide:

> A description of how the Eligible Mitigation Action mitigates the impacts of NOx emissions on communities that have historically borne a disproportionate share of the adverse impacts of such emissions.

Many of our major metropolitan areas combine the following attributes: they have the densest traffic in the state, the highest levels of smog and the highest ratio of environmental justice communities.



Additionally, as seen in the graph "Racial Over and Under Representation in Nonattainment Counties in CA," there is a correlation between decrease air quality and an increase in overrepresentation of minority populations. This trend is observed throughout the nation.[25]

As discussed below, investing EMT funds in diesel or natural gas simply perpetuates reliance on dirty fossil fuels, and the unsafe levels of smog and other public health pollutants they lead to. While they may incrementally reduce NOx emissions, they are not zero emission vehicles, nor does their adoption help build out the infrastructure we need to have a truly modern, clean and safe transportation sector.

E. Our State Should Invest EMT Funds In Electric Transportation To Drastically Reduce Carbon And Secure Critical Climate Benefits.

[24] California Air Resources Board, "Public Review Draft, June 27, 2012, Vision for Clean Air: A Framework for Air Quality and Climate Planning" at 4, available at: http://www.arb.ca.gov/planning/vision/docs/vision_for_clean_air_public_review_draft.pdf.

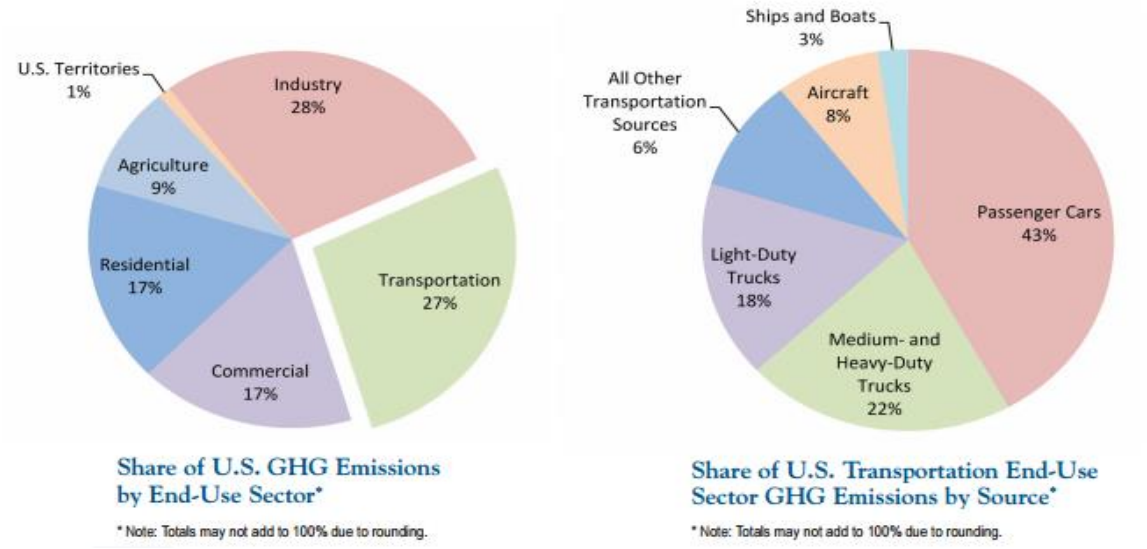
[25] Sierra Club Environmental Law Program (September 2015), "Environmental Justice and Levels of Ozone".

The broad consensus is that the United States and other countries must reduce carbon emissions by at least 80% economy wide by 2050 to stave off the worst effects of climate change. The United States is experiencing important progress in reducing carbon emissions from the electric sector as it transitions away from coal fired electricity generation and toward cleaner generation sources.

To achieve an 80% reduction in total greenhouse gas emissions, the United States simply must decarbonize its transportation sector. This is inescapable given the fact that the transportation sector accounts for approximately 27-28% of the US's total greenhouse gas emissions.

Figure 1: Transportation Emissions of the US

(Source: Environmental Protection Agency: Office of Transprotation and Air Quality, "Fast Facts: US Transportation Sector Greenhouse Gas Emissions 1990-2011," September 2013 available at: https://www3.epa.gov/otaq/climate/documents/420f13033a.pdf).



Numerous studies have concluded that EVs have a key role to play in decarbonizing the electric sector.[26] Indeed, researchers have concluded that electrification of the vehicle fleet is "pivotal" and that even "after other emission reduction measures [are] employed to the maximum feasible extent" in other sectors of society, "there was no alternative to widespread switching of direct fuel uses (e.g., gasoline in cars) to electricity in order to achieve the reduction target."[27]

[26] Williams et al., "The Technology Path to Deep Greenhouse Gas Emission Cuts by 2050: The Pivotal Role of Electricity", Science, January 2012; Yang, C., McCollum D., McCarthy, R., Leighty, W., Transportation Research Part D: Transport and Environment 14, 2009; Melaina, M. Webster, K., "Role of fuel carbon intensity in achieving 2050 greenhouse gas reductions within the light-duty vehicle sector", Environmental Science and Technology 45 (9), 2011; International Energy Agency, Transport, Energy, and CO2: Moving Towards Sustainability, 2009.

[27] "Williams et al., "The Technology Path to Deep Greenhouse Gas Emission Cuts by 2050: The Pivotal Role of Electricity", Science, January 2012.

The International Energy Agency (IEA) has similarly concluded that if the US is to meet carbon reduction objectives, "EV/PHEV sales must reach substantial levels by 2015 and rise rapidly thereafter." Annual EV sales in 2020 in North America must reach 1,500,000 EVs, and the US must have 10 million PEVs on the road by 2025.

Figure 2: EV/PHEV Total Sales by Region Through 2020

(Source: International Energy Agency, "Technology Roadmap: Electric and Plug-in Hybrid Electric Vehicles," June 2011, available at: http://www.iea.org/publications/freepublications/publication/EV_PHEV_Roadmap.pdf).