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How to Reverse the Upward Trend of GHG Emissions in California

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Recently, California's clean air agency (the Air Resources Board or CARB), announced great news. In 2016, a full four years before a legislatively mandated deadline, California achieved an important milestone – it had reduced its greenhouse gas (GHG) emissions below the state's 1990 levels.

Under AB 32, CARB was required to establish a target for the state's 2020 GHG emission rate, mandated to match or be lower than the state state's 1990 GHG emissions level. CARB set the ambitious AB 32 goal at 431 MMTCO2e. In 2016, the state's GHG emissions dropped to 429.4 MMTCO2e. Achieving these reductions earlier than expected is all the more impressive as it has been achieved during a period of substantial economic and population growth in the nation's most affluent state.

In no way can this accomplishment be belittled or downplayed. It is a monumental triumph of the state's policies to reduce emissions of climate altering gases. However, there were some disquieting revelations embedded in the report.

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Some – But Not All – GHG Emissions Have Been Reduced

First, almost all of the emission reductions came from the electricity generation sector; where increased use of renewables, a productive hydro-electric season, and the replacement of coal-fired power with electricity generated by natural gas led the carbon-reduction effort. Thus, GHG emissions could increase should lower levels of rainfall dry up hydro electricity's contribution to the power supply and increase the use of natural gas peaker plants to compensate for the loss of renewable power during hot summer days.

Second, the transportation sector's carbon emissions have actually increased year-over-year since 2013, in spite of the fact that today's vehicles are more energy efficient and emit drastically less pollutants than their predecessors from the 1990s. Although transportation emissions are lower today than in the base year of 2000, between 2013 and 2016 GHG emissions from the transportation sector rose at an average annual rate of 2.8 million metric tonnes of carbon dioxide equivalent (MMTCO2e) per year. This upward trend is blamed on a variety of different factors: low gas prices, a growing economy, higher employment, consumers' preference for roomier, less efficient vehicles and a slower-than-anticipated transition to electric models.

Zeroing in on California Transportation Emissions

It warrants digging a little deeper into the increase in emissions from the transportation sector. Transportation is the largest single source of GHG emissions in California, spewing 39.5% of the state's total GHG emissions into the atmosphere.

Not only is the mass of transportation emissions increasing, its portion of the inventory is growing as well. Thus, to both maintain the accomplishment of reaching the AB 32 goal, as well as meeting the much more stringent SB 32 requirement – which is a 40% reduction below 1990 levels by 2030 – the state will need to achieve substantial reductions from the growing mobile source of GHG emissions in the near term. Unfortunately, the Administration of Governor Jerry Brown is taking steps that makes meeting this goal all but impossible.

To understand this, it is important to note that CARB cites one of the reasons that the transportation sector's GHG emission are increasing is because of "slower than anticipated transition to electric" vehicles. This could have been predicted, given how long it has taken California to achieve long sought zero emission vehicle (ZEV) sales targets.

By way of reminder, it was 28 years ago that CARB first adopted requirements for automobile manufacturers to build and sell ZEVs in California. The mandate, established in 1990, that stated seven percent of the vehicles sold by major auto makers be ZEVs by 1997, still has not been met (in 2017 5.31% of total auto sales were battery electric or fuel cell vehicles). Although the original seven percent goal was long ago modified by CARB, 2018 might be the year where California meets the 1997 ZEV sales targets as projections show that 9.5% of total automobile sales could be ZEVs by the end of the year. Nevertheless, it is instructive and notable that California needed 28 years to achieve this rather modest ZEV sales objective.

The historical pace of ZEV adoption is critical to forecasting the future, helps us understand why GHG emissions in the transportation are increasing and informs the challenges facing the state as we shift our attention to achievement of the SB 32 GHG emission targets. Part of the problem with Governor Brown's strategy to reduce GHG emissions in the transportation sector, and meet a 40% reduction goal for 2030, is that it is both overly dependent on one technology – battery electric vehicles – and that it is overly dependent on back-loaded emission reductions.

Although the 2016 report on California Greenhouse Gas Emissions for 2000 to 2016 does pay lip service to the GHG reduction benefits of biogas and renewable diesel, it is clear from all other indicators that the state wants to meet its GHG reduction goals through the electrification of its transportation sector.

The limitation of this approach is that Sacramento is sacrificing immediate and near-term GHG emission reductions in the hope that investment in electric technologies will yield a dam-burst of zero tailpipe emission reductions before 2030.

This vision is supported by the state's use of its incentive funds. The single greatest recipient of the state's Greenhouse Gas Reduction Funds (GGRF), AB 118 resources, and other funding and incentive programs for emission reductions in the transportation sector is by far research, development, demonstration, testing and deployment of electric transportation technologies. Although administration representatives tout a "technology-neutral" approach to emission reductions in the transportation sector, all one needs to do is follow the money and the emissions trends to find proof that this is not the case.

The limitation of this approach is that Sacramento is sacrificing immediate and near-term GHG emission reductions – and the associated co-benefits of reduced smog forming pollutants and toxic air contaminants – in the hope that investment in electric technologies will yield a dam-burst of zero tailpipe emission reductions before 2030. History instructs us that such expectations are misplaced.

The Brown Administration seems to be betting that battery technology will make a quantum leap in capability and capacity with an equally dramatic decrease in price so that the transportation sector reverses decades of sales trends and recent increases in transportation GHG emissions.

Although it is reasonable to assume that battery technology will eventually evolve to the point where the industry can meet the range, cost, and durability requirements to provide customers with affordable and desirable EVs, it is a real concern that these breakthroughs may not happen in the timeframe necessary to enable the state to meet both GHG and air pollution targets mandated by state and federal law.

Regulators may be wagering too much on future developments happening in time, in volume, and at a cost that will result in a massive shift in current transportation trends, while realizing mammoth emission reductions in the final years of the next decade.

A Change of Course to Achieve Immediate GHG Emission Reductions

Thankfully, this approach of disproportionate reliance on a single solution to yield dramatic future emissions reductions is not the state's only choice. By taking a small fraction of the available state resources, California can reverse the trendline of increasing transportation GHG emissions, address GHG emissions in two other sectors that are flat or increasing, and accelerate the pace with which it protects vulnerable populations from deadly diesel exhaust.

Not only would this program more than mitigate the increase the state saw in GHG emissions between 2013 and 2016, but by 2030 it would also reduce smog-forming emissions 182% more than if these resources were used for similarly sized electric only technologies.

How can this be accomplished? Over the five fiscal years between 2013 and 2018, the state appropriated nearly $6.15 billion from the Greenhouse Gas Reduction Fund (GGRF) to a variety of different programs intended to reduce GHG emissions. That is an average of $1.23 billion annually over the last five years. If California diverted just 8.1% a year ($100 million annually) to a program that funds the purchase of commercially available near-zero emission natural gas trucks, assuming a buy down of $65,000 per truck, and required that the trucks consume renewable natural gas (particularly RNG produced by a new generation anaerobic digesters and other renewable gas-producing facilities that process the state's organic waste), by the middle of 2023 California would reduce enough GHGs to offset the increase we experienced between 2013 – 2016. By 2030, the vehicles funded by this program would be reducing GHGs by 5.9 MMT annually. Not only would this program more than mitigate the increase the state saw in GHG emissions between 2013 and 2016, but by 2030 it would also reduce smog-forming emissions 182% more than if these resources were used for similarly sized electric only technologies.

In addition, this strategy will bring substantial added value by incentivizing increased reuse, recovery, and recycling of the state's organic waste, creating thousands of jobs in the construction and operations of hundreds of new renewable energy production infrastructure. Perhaps most importantly, all this can be achieved **without** weakening the state's priority to increase the use of electric vehicles over the long-term and increase the proportion of the state's power that comes from renewable resources.

California needs to be more thoughtful about its use of its limited resources for incentive programs. By diversifying its investment portfolio and placing a greater emphasis than it does now on early deployment of proven and commercially available GHG-reducing transportation technologies, California policy-makers increase the prospects for meeting our SB 32 mandate. This approach will also encourage substantial private expenditures in a key pillar of California's GHG reduction strategy – the 40% reduction in fugitive methane emissions by 2030 (the goal enshrined in SB 1383). Ask the operator of any facility, private or public, that is a source of fugitive methane and they will say that the most effective inducement for any entity to capture its emissions is for there to be a robust, growing and immediate market for the fuel in California's transportation sector.

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A $100 million per year investment in near-zero emission trucks that will encourage increased investment in California-produced renewable natural gas is the single most significant step the state can take now to reversing current trends of GHG emission increases in the transportation sector. It would have no impact on the pace of adoption of electric transportation technology and would provide a tremendous boost to the state's efforts to protect vulnerable populations from diesel exhaust. This strategy has the added benefit of stimulating private investment in contemporary methane emission reduction and will achieve greater GHG emission reductions from the transportation sector in the near term, which will also increase the likelihood of meeting our 2030 GHG reduction goals. If it wants to reverse increases in mobile source GHG emissions, enhance efforts to meet SB 1383 targets and accelerate achievement of the state's 2030 GHG reduction goals, Sacramento should consider diversifying its spending habits.