



COLORADO
Division of Capital Assets
Department of Personnel
& Administration

State Fleet Management
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To: Joint Budget Committee, Senate Transportation Committee, and House Transportation & Energy Committee

From: June Taylor, Executive Director, DPA

Subject: Fiscal Year 2017-18 Vehicle Acquisition Report

This report is submitted pursuant to 24-30-1104 (2)(c)(II), C.R.S. and 24-30-1104 (2)(c)(V), C.R.S. concerning State fleet vehicle acquisitions. The Department of Personnel & Administration (Department) is directed by statute to “adopt a policy to significantly increase the utilization of alternative fuels and that establishes increasing utilization objectives for each following year.” The Department is required to purchase vehicles that operate on compressed natural gas (CNG), plug-in hybrid electric vehicles (PHEV), battery electric vehicle (BEV) or other alternative fuels if either the increased base cost of such vehicle or the increased life-cycle cost of such vehicle is not more than ten percent over the cost of a comparable dedicated petroleum fuel vehicle.

State Fleet Management (SFM) collaborates with each agency to maximize the use of alternative fuel vehicles (AFVs) in the State fleet and to ensure each replacement vehicle can perform adequately in the field.

SUMMARY OF FISCAL YEAR 2018 VEHICLE ACQUISITIONS

In Fiscal Year 2017-18 the Department placed orders for (2) CNG vehicles within previously approved budgeted appropriations.

For multiple years the Department has experienced challenges with respect to CNG vehicle costs exceeding the 10 percent threshold and fewer CNG vehicle platforms being offered by manufacturers. In addition, the State’s vehicle ordering timeline continues to be a challenge in aligning with grant funding opportunities. Due to the significant additional equipment costs, without the offset of this funding resource to the vehicle purchase price, procurement of this AFV platform is challenging.

In Fiscal Year 2017-18 CNG purchases were not cost-effective in most cases. Infrastructure expansion was flat in the fiscal year. Industry indicators point to CNG displacing approximately 1% of the vehicles within the light duty market place in the coming years.



The Department placed orders for (215) E85 Flexible Fuel Vehicles (FFV), subject to availability. This result was achieved due to the fuel's cost neutrality, and the equipment up-fit compared to the dedicated petroleum vehicle cost, being less than 10 percent. This represents 30.98% of all vehicle orders.

Hybrid vehicles continue to be a viable option for many operational duties. This year (142) were ordered. The comparable life-cycle cost on the models ordered was less than 10 percent compared to their gasoline equivalents' life-cycles. This represents 20.46% of all vehicle orders. As Hybrid vehicle platforms have become more commonplace, their associated cost has decreased and their on-board technology has become more efficient. The industry has demonstrated a focus on this pairing of electrification and the internal combustion engine as an efficient means to reduce fuel consumption.

Building on the previous year's original PHEV purchases, the Department has identified (7) PHEVs representing 1.01% of fleet purchases. PHEV are a good purchase opportunity to help bridge the cultural gap between current petroleum consuming vehicles and the future expansion of vehicle electrification.

In FY18 BEV partnerships with the National Renewable Energy Laboratories focusing on vehicle utilization recognized the opportunity for very deliberate expansion opportunities. These studies resulted in the expansion of (13) BEVs throughout the front range. The studies used telematics devices installed on the proposed replacement vehicles, and identified the proper utilization model, as well as, available charging infrastructure, as the two key hurdles to successful electric vehicle implementation.

The Department ordered (315) dedicated petroleum vehicles this year that represents 45.39% of all vehicle orders, with the Colorado Department of Public Safety ordering (205) of those vehicles. Of the (315) the Department ordered, (285) were Gasoline and (30) were diesel vehicles for various agencies. This represented 41.07% and 4.32% of all vehicle orders respectively. The diesel power train has become a specialized ordering item due to the high added cost and average rate of return on investment.

DPA PROCEDURES & POLICIES ON ORDERING NEW VEHICLES

The Department's vehicle ordering process is governed by 24-30-1104, C.R.S. and the Governor's executive orders¹, focusing on AFVs, emphasizing a menu approach for the appropriate vehicle selection. As there is a vast array of job duties required of the State's vehicle fleet, a menu approach allows agencies to identify the correct AFV available for their needs.

¹ Governor John Hickenlooper, Oct 28, 2015 Executive Order D2015-013 PG 2,II
July 11, 2017 Executive Order D2017-015 PG 2 II,C



Statute requires the Department to purchase AFV capable vehicles whenever the base cost or life-cycle cost for the AFV is within 10 percent of the cost of the regular gasoline alternative. This will allow the State to take advantage of Colorado's vast reserves of natural resources, reduce our dependence on petroleum, create new jobs, and reduce our carbon footprint.

SFM depends on the cooperation and collaboration of all other State departments and the Governor's Office to fulfill its mission. SFM is invested in functional partnerships and production of accessible analytics tools for the agencies Motor Vehicle Advisory Council and Greening Government Leadership Council to monitor their performance at the unit level. SFM also has produced documentation within the new vehicle ordering packets for the agencies. These specific instructions guide departments through the selection process so the most effective vehicle can be purchased and put into service.

AFV models must be reviewed and considered as the first level of choice during the vehicle selection process. If it is determined that the AFV models available for purchase as CNG, PHEV, or BEV will not meet the functional requirements of the department, the agency will review all vehicle options and another type of alternative fueled vehicle such as Hybrid or E85 (FFV) will be selected. The last option will be to purchase a gasoline or diesel petroleum consuming vehicle. If the available proposed AFV model will not work for the department, an additional form "Non-AFV Purchase Justification Form" must be completed and signed off on by the Executive Director of each agency.

INFRASTRUCTURE STRATEGY

The SFM works closely with the Colorado Energy Office, Department of Energy's Clean Cities Coalition, Regional Air Quality Council, National Renewable Energy Laboratory, political subdivisions, and representatives from AFV suppliers, infrastructure manufacturers, and developers to foster best practices and strategies to develop AFV infrastructure statewide. Since AFV fuel sites, particularly CNG, often require a baseline fuel commitment from fleets in order to legitimize operations, it is imperative for the growth of AFVs in Colorado that there are adequate concentrations of AFV vehicles in place at or near these fueling sites in order to ensure a sustainable alternative fuels market at the local level. Additionally, cooperative processes must be developed between the private sector, and the federal, state, and local government agencies to help diversify the extensive cost of AFV fueling infrastructure. The State of Colorado sets an example, by purchasing AFV vehicles, for a number of local governments, private fleets, and other states thereby building demand for AFV far beyond State fleet vehicles. The expanded use of telematics is the key to understanding the opportunities and creating an efficient mechanism to expend limited resources. Working closely with the departments and the Colorado Energy Office, SFM will continue to provide thorough guidance on the placement of these vehicles, in tandem with other public and private fleets, so potential fuel volumes may be combined in support of Colorado's alternative fuels market.



In 2012, Governor Hickenlooper and Governor Fallin of Oklahoma worked together to develop the unprecedented, bi-partisan, multi-state memorandum of understanding (MOU) to aggregate the purchasing power of 22 states to promote CNG vehicle technology, help move the country closer to energy independence, and increase access to a locally developed, low-cost, and environmentally beneficial source of fuel energy. By increasing demand for CNG vehicles, the signatory states could in turn drive automakers to make available more models capable of using CNG at a reduced cost. Furthermore, local governments and private fleets followed the Governors' example, signing onto a fleet MOU committing to support CNG throughout the state. As a major natural gas producer, Colorado benefits from these initiatives by supporting jobs, reducing emissions, and providing long term, low cost fuel for consumers and fleets.

In October of 2017, the Governors from Colorado, Utah, Nevada, Montana, Wyoming, New Mexico, Idaho and Arizona signed the Regional Electric Vehicle Plan for the West (REV West) MOU. This MOU provides a framework for creating an Intermountain West Electric Vehicle Corridor to make it possible to drive an electric vehicle across the Signatory States' major transportation corridors. Also in 2017, Governor Hickenlooper signed an Executive Order with a directive for a statewide electric vehicle plan to build out key charging corridors that facilitate economic development and boost tourism across the state while reducing harmful air pollution. The electrification of these corridors is expected to reduce range anxiety and drive further adoption of EVs while helping transform the market by allowing smaller communities to plug into the regional system.

This planning and support for the build out of EV infrastructure and elimination of range anxiety provides direction for the State and other public and private fleets to purchase more EV fleet vehicles. Working closely with the departments and the Colorado Energy Office, SFM will provide guidance on the proper placement of these vehicles and additional charging equipment for fleet charging in order to maximize successful deployment. One such example would be the continued expansion of the PHEV platform. The flexibility of the PHEV's dual fuel sources is a promising bridge technology to capitalize on the expansion of the EV charging infrastructure, by supplementing a portion of petroleum fuel consumption with electrical charging.

AVAILABILITY OF AFV INFRASTRUCTURE STATEWIDE

In 2015, the Colorado Energy Office commissioned the Colorado State Fleet Opportunity Assessment, a study to assess the best options for AFV deployment and the use of telematics and data collection in the State fleet. Fleet managers from several State agencies including CDOT and DPA advised on the methodology and results of the study. The outcome of this report indicated high potential for further deployment of dedicated AFV vehicles as well as bi-fuel AFV vehicles, which hold strong potential for increased deployment due to their flexibility, range, and potential for substantial increases in fuel economy in hybrid-electric scenarios. These findings can be used to guide SFM in future vehicle purchases and acquisition efforts. Initial results of these original purchases have demonstrated the key importance of fueling infrastructure in the relatively near



proximity to the operational area of the vehicle. It has also illustrated the overwhelming importance the decision the driver of the vehicle makes when fueling the vehicle, especially when there are multiple fuel choices.

As of October, 15, 2018, there are 22 public access CNG fuel sites in operation statewide with additional stations in progress. The Colorado Energy Office, through the ALT Fuels Colorado grant program, has made awards to 8 stations across the state. These stations are all operational: Glenwood Springs, Pueblo, Trinidad, Colorado Springs, Commerce City, Eaton, Gunnison, and Greeley. Because nearly all of the CNG vehicle models available can be purchased as dual fuel vehicles (i.e. they can utilize either CNG or gasoline), we have greater flexibility in the placement of these vehicles. The Energy Office will continue to work with public and private fleets and fuel providers to develop additional CNG stations at key locations along major transportation corridors throughout the state, helping to complete development of an intrastate network for CNG travel.

In addition to the 22 stations mentioned above, there are approximately 10 private access CNG fuel sites in Colorado. To date, the State has not been able to secure agreements to use these facilities due to liability concerns and the fact that the location of many are in locked, secured areas on private property. As an exception, SFM has been able to engage with the City and County of Denver and is utilizing its private CNG fueling facilities.

Vehicle electrification has promise to be an effective alternative to other attempts to move away from the historical norm of petroleum powered vehicles with vast manufacture investment and an already substantial number charging stations. CNG with 22 stations and E85 with 79, both fall short of the current Electric Vehicle Support Equipment (EVSE) in the region at 637 charging stations. Infrastructure is the most critical hurdle to influencing the cultural adoption of alternative fuels. Technology will advance in the next 5-10 years to allow a wider acceptance of vehicle electrification, but in the early rollout employees and private owners will need reassurance that range anxieties can be answered. With this said the agencies themselves will have to identify and request funding for locations to place EVSE.

EXEMPTIONS

SFM is required by statute to purchase an alternative fuel vehicle if either the increased base cost of such vehicle or the increased life-cycle cost of such vehicle is not more than ten percent over the cost of a comparable dedicated petroleum fuel vehicle. The executive director is required to adopt a policy to allow some vehicles to be exempted from this requirement. Current exemptions include:

- Colorado Department of Public Safety (CDPS) law enforcement “patrol”, “undercover”, and “specialized” vehicles like crime scene labs and hazardous materials vehicles are



exempted from this requirement until such time AFV vehicles are available and proven reliable and certified. However, CDPS is required to purchase AFV vehicles wherever practicable except for the exemptions listed above.

- Non-CDPS law enforcement “certified patrol” vehicles used by State agencies are exempt from this requirement until such time AFV vehicles are available and proven reliable and certified for this function. At this time this will include Ford Police Interceptors, Police Dodge Chargers, Chevy Police Tahoe, Ford Police Expedition and Interceptor Utility, and Police Dodge Durango. Note: Currently there are no “Pursuit” rated CNG models available for patrol vehicles from the manufacturer. This is a standard of the Colorado State Patrol (CSP) to perform the required task. The Ford Police Responder, a hybrid platform police vehicle, was reviewed by CSP, and the platform was deemed incapable of performing the strategic mission of the agency.
- This also may cover vehicles that have specialized equipment affixed to the vehicle making it less suitable for general transportation. These vehicles are essentially a “tool on wheels” or “mobile shop” that would be difficult to accommodate large additional fuel tank and battery storage configurations and be certified by the OEM. Examples include a drilling unit, water tanks, lab/research equipment, plumbing or telecommunications equipment, and patient and prisoner transport vehicles.
- Other unknown potential exemptions will be considered on a case by case basis only.

The table below identifies the number of acquisitions by fuel type configuration or hybrid vehicles by department for FY18.



| FY 2017-18 Acquisitions by Department and Fuel/Hybrid Type | | | | | | | | |
|--|--------------|---------------|--------------|---------------|--------------|--------------|---------------|---------------------|
| Department | AFV | | | | | NON-AFV | | Total by Department |
| | CNG | E85 | Hybrid | PHEV | BEV | Diesel | Gasoline | |
| CDPS | - | 17 | 3 | 7 | - | - | 202 | 229 |
| CDA | - | 6 | - | - | - | - | 4 | 10 |
| CDOC | - | 43 | 3 | 31 | 5 | - | 7 | 89 |
| CDE | - | 1 | - | 1 | - | - | - | 2 |
| CDPHE | - | 2 | 1 | 19 | - | - | 1 | 23 |
| CDHE | - | 24 | 2 | 2 | - | 1 | 7 | 36 |
| CDHS | 1 | 8 | - | 19 | - | - | 8 | 36 |
| LAW | - | - | - | 4 | - | - | - | 4 |
| DOLA | - | 1 | - | 6 | - | - | - | 7 |
| CDLE | - | 2 | - | 3 | - | - | - | 5 |
| DMVA | - | - | - | - | - | - | - | - |
| DNR | - | 76 | 21 | - | - | 1 | 13 | 111 |
| DOR | - | 7 | - | 9 | - | - | 4 | 20 |
| DORA | - | 14 | - | 1 | - | - | 2 | 17 |
| SOS | - | - | - | - | - | - | - | - |
| CDOT | - | 11 | - | 27 | - | 10 | 37 | 85 |
| GOV | - | 2 | - | - | - | - | - | 2 |
| DPA | 1 | 1 | - | 3 | 2 | 1 | - | 8 |
| JUD | - | - | - | 10 | - | - | - | 10 |
| Total Acquisitions | 2 | 215 | 30 | 142 | 7 | 13 | 285 | 694 |
| Percent of Total | 0.29% | 30.98% | 4.32% | 20.46% | 1.01% | 1.87% | 41.07% | 100.00% |

AFV VEHICLE ACQUISITIONS – FY 2007-08 to FY 2017-18

Since January of 2008 Colorado has been committed to purchasing AFVs available in the market place. Fueling infrastructure continues to be a major hurdle when investing in AFV technologies. Additionally, budget constraints can play a role in the investment in emerging technologies. For example, the economic crash in FY 2008-09 resulted in the State only approving vehicles to be replaced in FY 2010-11 and FY 2011-12 if they had an impact on life, health, or safety. Most of these vehicles were for the Department of Public Safety, State Patrol Division with limited AFV



opportunity, the majority E-85 and Hybrid. Broader AFV acquisitions resumed in FY 2012-13. See the table below for a summary of vehicle acquisitions from FY 2007-08 to FY 2017-18.

The SFM Program was able to purchase a total of 3,631 alternative fueled vehicles capable of reducing significant quantities of petroleum from FY 2007-08 to FY 2017-18. E-85 continues to be a viable option as an AFV, with some reduction in fuel infrastructure noted, as well as, a reduced number of vehicle options in the sedan categories due to the rise of Hybrid, PHEV and BEV options. As stated above, the industry has dedicated a significant effort to the expansion of vehicle electrification. That has led to more applications and a broader spectrum of choices for implementation. It has also allowed for the economies of scale to be better realized. This has allowed for purchases of 964 Hybrid from FY 2007-08 to FY 2017-18. The PHEV platform is showing continued growth with a total of 25 vehicles purchased between FY 2007-08 and FY 2017-18. The 13 BEV purchases have been a concisely focused effort using lessons learned from previous AFV rollouts, to identify current State owned infrastructure, then review the utilization patterns through telematics, prior to procurement. This has created a more measured approach, but the intent is to identify strong use cases as the technology expands. Lessons learned have demonstrated that users soured to an AFV class can taint the larger pool, making adoption significantly more difficult.

| Summary of Vehicle Acquisitions - FY 2007-09 to FY 2017-18 | | | | | | | | |
|---|------------|--------------|---------------|-------------|------------|----------------|-----------------|---------------------------|
| Fiscal Year | AFV | | | | | NON-AFV | | Total Acquisitions |
| | CNG | E85 | Hybrid | PHEV | BEV | Diesel | Gasoline | |
| 2008 | - | 284 | 30 | - | - | 52 | 288 | 654 |
| 2009 | - | 303 | 213 | - | - | 44 | 335 | 895 |
| 2010 | - | 245 | 86 | - | - | 5 | 215 | 551 |
| 2011 | - | 98 | 4 | - | - | 30 | 109 | 241 |
| 2012 | 1 | 113 | 12 | - | 2 | 9 | 180 | 317 |
| 2013 | 81 | 220 | 53 | - | - | 21 | 191 | 566 |
| 2014 | 153 | 233 | 61 | - | - | 16 | 217 | 680 |
| 2015 | 35 | 246 | 69 | - | - | 40 | 331 | 721 |
| 2016 | 48 | 128 | 158 | 12 | 1 | 44 | 274 | 665 |
| 2017 | - | 221 | 136 | 6 | - | 46 | 145 | 554 |
| 2018 | 2 | 215 | 142 | 7 | 13 | 30 | 285 | 694 |
| Total | 320 | 2,306 | 964 | 25 | 16 | 337 | 2,570 | 6,538 |

SUMMATION



The vehicle transportation industry has become vastly more complex as technology advances, infrastructure develops, and public and private policymakers' priorities evolve. The logistical solutions for moving State employees to effectively serve the public have likewise become more complex. The State's large foot print creates challenges with the type of solution chosen and insight into the most efficient operation of the transportation vehicle.

Fleet ownership is still an absolute necessity in many of the tasks that the State provides. With that ownership comes the responsibility to provide guidance and support to the employees of the respective agency to be more efficient in the operation of the vehicle.

The need for data to identify travel patterns increases as the agencies strive to meet this goal. A key tool in the collection of data is the use of vehicle telematics. Telematics is the integration of the vehicles onboard computers and pairing the information with GPS reporting. The State has engaged in early piloting of EV specific telematics deployments, and plans to increase its use and access of the data produced by this technology in the coming year on vehicle models that will be offered in AFV formats.

Investing in technologies that provide tools for operational guidance at the front line staff level is one of the important actions that must be taken if the goal is to effectively reduce fuel consumption, and improve utilization of the appropriate AFV. This investment must be systemic in nature and requires the cooperation and support of the leadership at all levels.

Ultimately, disruption in the vehicle market place will create the opportunity to appropriately utilize these technologies. The State must be positioned to help our employees transition into this new era of mobility.

