



MEMORANDUM

TO: Joint Budget Committee, Senate Transportation Committee, and House Transportation & Energy Committee
FROM: Tobin Follenweider, Interim Executive Director, Department of Personnel & Administration
DATE: November 1, 2021
RE: State Fleet Vehicle Acquisition Report - Fiscal Year 2020-21

This *State Fleet Vehicle Acquisitions* report is submitted pursuant to 24-30-1104 (2)(c)(II), C.R.S. and 24-30-1104 (2)(c)(V), C.R.S. The report highlights the Department of Personnel & Administration’s efforts to increase Alternative Fuel Vehicles (AFV) in the State Fleet. This effort is supported by State agencies, policies, and statute.

Colorado statute directs the Department of Personnel & Administration to “adopt a policy to significantly increase the utilization of alternative fuels and that establishes increasing utilization objectives for each following year.” 24-30-1104 (2)(c)(II), C.R.S. requires the Department to purchase plug-in hybrid electric vehicles (PHEV), battery electric vehicles (BEV), compressed natural gas vehicles (CNG), or other alternative fuel vehicles if either the increased base cost or the increased life-cycle cost of the vehicle is not more than 10% over the cost of a comparable dedicated petroleum fuel vehicle. If the purchase of an Alternative Fuel Vehicle (AFV) is not below the 10% mandate, the Department will recommend the purchase of the most applicable AFV to the assigned agency based on Executive Orders directive for the adoption of low emissions vehicle deployment.

State Fleet Management (SFM) collaborates with each agency to maximize the use of AFV in the State fleet and to ensure each replacement vehicle can perform adequately in the field. In the event that an agency cannot adopt any available AFV option, the Executive Director of the agency must submit documentation supporting the justification of noncompliance with the AFV mandates. This documentation is reviewed by the Department and the Colorado Energy Office for approval.





SUMMARY OF FISCAL YEAR 2021 VEHICLE ACQUISITIONS

SFM worked with State agencies, local government and the private sector across the State to find creative solutions and products that provide agencies with flexibility and responsive solutions while allowing the State fleet to adopt new, innovative vehicle solutions to support AFV requirements. The following highlights these efforts.

Battery Electric & Plug-In Hybrid Electric Vehicles

In partnership with National Renewable Energy Laboratories (NREL), The State conducted utilization of vehicle electrification studies in FY18, FY19, and FY20. This resulted in the development of technology and data generation to better understand the most efficient adoption of electric vehicles. The studies used telematics devices pre-installed on the vehicles. As a result, two key hurdles to successful EV implementation were identified: (1) the need for information on vehicle operational area and use in order to target electrification and (2) the need for charging infrastructure, particularly where the vehicle is stored when not in use.

Based on the state's studies, Telematics was installed on 674 plus state vehicles and is slated for expansion of 25% or 1,575 state vehicles in FY 2021-22. The expansion of telematics will be used to review the fleet more broadly for efficiency and safety measures. This will directly allow for the review of electric vehicle expansion opportunities and petroleum reduction in general.

These efforts resulted in the expansion of Plug-In Electric Hybrid Vehicle purchases. To that end the Department purchased 115 PHEVs, representing 19.3% of FY 2020-21 fleet purchases. PHEVs, powered by both an internal combustion engine and an electric motor that uses the electricity stored in the vehicle's battery, are a good purchase opportunity to help bridge the cultural gap between current petroleum consuming vehicles and the future expansion of vehicle electrification. To maximize the positive impact of the PHEV technology efficiencies, the operators must consistently charge overnight to ensure that PHEV batteries are charged and ready for use the following day.





Battery Electric Vehicles (BEV) currently have technology and production limitations, but with increased adoption and demand, manufacturers are providing increased quantities of capable products. Advances in technology and reductions in cost have made BEV's more attainable. Currently, the main limitation to a broader deployment is vehicle charging infrastructure. Nonetheless, the state purchased 2 BEVs, 0.34% of fleet orders in FY 2020-21.

Compressed Natural Gas

For many years, the Department experienced challenges with respect to the fact that CNG vehicle costs generally exceed the 10% threshold and fewer CNG vehicles are offered by manufacturers. In addition, the State's vehicle ordering timeline continues to be a challenge in aligning with AFV grant funding opportunities. Due to the significant additional equipment costs, and limited grant funding to offset the CNG vehicle purchase price, procurement of CNG powered vehicles continues to be a challenge.

In FY 2020-21, the Department placed no orders for CNG vehicles. Infrastructure expansion was flat during the fiscal year and industry indicators point to CNG displacing approximately only 1% of the vehicles within the light duty market place in the coming years. This trend has also been supported by the lack of development of CNG vehicle repair facilities and limited fueling sites throughout the state.

Hybrid Vehicles

Hybrid vehicles continue to be a viable option for many operational agencies. In FY 2020-21, SFM ordered 161 hybrid vehicles. This represents 27% of all vehicle orders. The comparable life-cycle cost on the hybrid models was less than 10% compared to their gasoline equivalents. As hybrid vehicle platforms are more commonplace, their associated costs have decreased, their on-board technology more efficient, and overall reduce the state's carbon footprint.

Flexible Fuel Vehicles

The Department placed orders for 124 E85 Flexible Fuel Vehicles (FFV). This represents 20.81% of all vehicle orders. The cost of fuel and equipment to outfit vehicles for E85 is less than 10% of comparable standard petroleum vehicles. While E85 fuel has been an inexpensive fuel, industry trends and announcements from vehicle manufactures have marked a





movement away from E-85. Specifically, manufacturers are reducing the availability of models with this capability. This continues to be an area of change in the market as many of these vehicles have been replaced with Hybrid platform vehicles including Hybrid trucks.

Petroleum Vehicles

The Department ordered 194 dedicated petroleum vehicles this year, representing 32.55% of all vehicle orders. 178 were gasoline and 16 were diesel vehicles. Respectively, this represented 29.87% and 2.68% of all vehicle orders. The diesel powertrain has become a specialized ordering item due to the high added cost of initial purchase and a lower average rate of return on investment. Two thirds of petroleum vehicles (131) ordered in FY 2020-21 were for the Colorado Department of Public Safety.

DPA PROCEDURES & POLICIES ON ORDERING NEW VEHICLES

SFM depends on the collaboration of all State agencies and the Governor's Office to fulfill its mission. SFM also has partnerships with both the Motor Vehicle Advisory Council (MVAC) and Greening and Government Leadership Council (GGLC) to support AFV deployment.

The Department's vehicle ordering process is governed by 24-30-1104, C.R.S. and Executive Orders. As stated above, statute requires the Department to purchase AFV capable vehicles whenever the base cost or life-cycle cost for the AFV is within 10% of the cost of the regular gasoline alternative. This allows 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.

The ordering process emphasizes 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. SFM also produced documentation that guides 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 choice during the vehicle selection process. If it is determined that the AFV models available for purchase as PHEV, BEV, or Hybrid





will not meet the functional requirements of the department, the agency will review all vehicle options, and another type of alternative fueled vehicles such as CNG or E85 will be selected. The last option will be to purchase a gasoline or diesel petroleum 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

SFM partners with the Colorado Energy Office, the U.S. 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 creates unique challenges, it is imperative for the growth of AFVs in Colorado that there are adequate concentrations of AFV vehicles in place at or near fueling sites. Additionally, cooperative processes must be developed between the private sector, and the federal, state, and local government agencies to help with the extensive cost of AFV fueling infrastructure. The State of Colorado sets an example for other governments and private fleets by purchasing AFV vehicles. Thereby, building demand for AFV far beyond State fleet vehicles. Working closely with the departments and the Colorado Energy Office, SFM will continue to provide thorough guidance on the placement of AFVs in tandem with other public and private fleets, in support of Colorado’s alternative fuels market.

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. 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. The MOU was updated in 2019 to reflect progress made by the states and include additional goals and strategies. In years 2017 through 2020 the Governor executed initiatives (E.O. D 2017-015, B 2018-006, D 2018-026, B 2019-002, D 2019-016) to focus efforts to reduce transportation sources of Greenhouse Gas





(GHG) emissions through vehicle electrification. These directives have added additional focus on Zero Emission Vehicle (ZEV) technologies to achieve these goals.

Working closely with the departments and the Colorado Energy Office, SFM provides 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 PHEVs 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. To be successful, agencies will need to ensure regular charging of PHEVs and manage fleets in a way that maximizes the environmental and economic benefits that come from the electric drivetrain.

The Colorado Energy Office is the lead on charging infrastructure in the State through developing grant programs that incentivize installation of electric vehicle charging stations across the state. Through Charge Ahead Colorado, CEO and the Regional Air Quality Council have provided grants for more than 1,500 stations across the state. Many state agencies have received awards for installation of charging stations from the Charge Ahead Colorado program. Through its corridor and plaza programs, CEO has also made awards for publicly available fast charging stations across the Metro Areas and along Colorado's major transportation corridors.

AVAILABILITY OF AFV INFRASTRUCTURE STATEWIDE

Vehicle electrification shows promise to be an effective alternative when compared to other attempts to move away from petroleum powered vehicles. Infrastructure remains a critical hurdle to influencing the cultural adoption of alternative fuels and public and private entities are taking steps to address the infrastructure gap. Private station developers like Electrify America and EVgo have built a number of high-speed charging stations along Colorado's interstates while also installing charging in and around the metro-Denver area. In 2019, CEO made an award to install high-speed charging stations at 34 locations across Colorado's major transportation corridors. Currently 17 stations are operational, with the rest anticipated by fall 2022. The Public Utilities Commission approved Xcel Energy's \$110 million Transportation





Electrification Plan in early 2021 which will result in significant investment in the utility's territory. State agencies are eligible to participate in Xcel's EV Supply Infrastructure program, which should reduce the costs for installing charging stations at State facilities in Xcel's territory. SB21-260 establishes the new Community Access Enterprise at CEO. Much of the funding deployed through this enterprise is expected to go toward incentivizing installation of charging infrastructure across the state for light duty, medium, and heavy-duty vehicles. Through SB21-230, CEO was provided with \$5 million to distribute through Charge Ahead Colorado. CEO is working with State agencies to fund installation of the charging infrastructure needed to increase electric vehicles in agency fleets.

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 10% over the cost of a comparable dedicated petroleum fuel vehicle. The Department's 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 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 these models will include Police Dodge Chargers, Chevy Police Tahoe, Ford Police Expedition and Interceptor Utility, and Police Dodge Durango. Note: Currently there are no "Pursuit"-rated CNG or Electric models available for patrol vehicles from the manufacturer. This "Pursuit" rating is a standard of the Colorado State Patrol (CSP) to perform the required task.





- Vehicles that have specialized equipment makes them less suitable for general transportation may also be exempted. 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 potential exemptions will be considered on a case by case basis only through a cooperative review established between the Colorado Energy Office and Department of Personnel and Administration. Currently, final signature authority for Non-EV purchases rest with the Governor’s office.

The table below identifies the number of acquisitions by fuel type configuration or hybrid vehicles by department for FY 2020-21.

FY2020-21 Acquisitions by Department and Fuel/Hybrid Type								
Department	AFV					NON-AFV		Total by Department
	CNG	E85	Hybrid	PHEV	BEV	Diesel	Gasoline	
CDPS	0	8	8	1	0	2	129	148
CDA	0	3	11	3	0	0	0	17
CDOC	0	16	2	45	0	0	6	69
CDE	0	2	0	0	0	0	0	2
CDPHE	0	0	4	5	0	0	0	9
CDHE	0	5	4	0	0	0	2	11
CDHS	0	21	2	11	0	1	10	45
LAW	0	0	0	5	0	0	0	5
DOLA	0	0	0	4	0	0	0	4
CDLE	0	3	0	0	2	0	0	5
DMVA	0	1	0	0	0	0	0	1
DNR	0	45	23	6	0	12	23	109
DOR	0	1	9	20	0	1	5	36
DORA	0	0	12	1	0	0	0	13
SOS	0	0	1	0	0	0	0	1
CDOT	0	13	75	14	0	0	3	105
GOV	0	3	2	0	0	0	0	5
DPA	0	3	0	0	0	0	0	3
JUD	0	0	8	0	0	0	0	8
Total Acquisitions	0	124	161	115	2	16	178	596
Percent of Total	0.00%	20.81%	27.01%	19.30%	0.34%	2.68%	29.87%	100.00%





AFV VEHICLE ACQUISITIONS - FY 2007-08 to FY 2020-21

Since January 2008, Colorado has been committed to purchasing AFVs available in the marketplace. Fueling infrastructure continues to be a major hurdle as noted above. Additionally, budget constraints can adversely impact 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 2018-19. This is a point in time report and variations are expected year over year.

From FY 2007-08 to FY 2020-21 the SFM Program was able to purchase a total of 4,703 alternative fueled vehicles capable of reducing significant quantities of petroleum. E-85 has seen a reduction as an option because of a reduction in fuel infrastructure as well as a reduced number of vehicle options due to the rise of more efficient Hybrid, PHEV, and BEV options. As stated above, the industry dedicated a significant effort to the expansion of vehicle electrification. That has led to more applications, a broader spectrum of choices, and overall economies of scale. This has allowed purchase of 1,453 Hybrid from FY 2007-08 to FY 2020-21. The PHEV platform is showing continued growth with a total of 211 vehicles purchased between FY 2007-08 and FY 2020-21. The 33 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 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 2007-08 to FY 2020-21								
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	9	1	44	277	665
2017	-	221	136	6	-	46	145	554
2018	2	215	142	7	13	30	285	694
2019	0	189	161	17	8	28	250	653
2020	0	67	167	57	7	36	257	591
2021	0	124	161	115	2	16	178	596
Total	320	2686	1453	211	33	417	3258	8378

SUMMARY

The vehicle transportation industry has become vastly more complex as technology advances, infrastructure develops, and public and private policy makers’ priorities evolve. The logistical solutions for transporting State employees to serve the public has likewise become more complex. The State’s large foot print creates challenges with AFV solutions and insight into the most efficient operation of the transportation vehicle can be situational.

Fleet ownership is still an absolute necessity in many of the tasks that the State provides. With ownership comes the responsibility to provide guidance and support to the state agency employees to be in the most efficient vehicle to meet their needs. To this end DPA is committed to working with the fellow agencies and providing guidance resources and general direction for the efficient operation of AFV. This effort resulted in AFVs accounting for more than two-thirds of new vehicle orders in FY 2020-21 and we expect the portion of AFVs to continue to rise in the coming years.





With each decision and technology, the need for data to analyze travel patterns increases. A keystone tool in the collection of operational data is the use of vehicles such as telematics. With the passage of a telematics deployment plan for the State Fleet, and approximately 1600 vehicles per year receiving this technology, insights to emerging alternative fuel types will become more clear and effectively established.

Vehicle fueling infrastructure is a continuing challenge because of the decentralized nature and the dependence of using the private industry for fueling. Deployment of new infrastructure is extremely costly and requires robust data analysis to better understand where new investment makes the most effective impact on the move towards a new cleaner transportation system. Agencies' need for this information will supersede the request for funding of a state owned electrified fueling infrastructure. Providing actionable information will help support a successful cultural change towards alternative fuels.

Ultimately, disruption in the vehicle market place is creating the opportunity to effectively utilize these technologies. The State must be positioned to help our employee's transition into this new era of mobility.

