

Department of the Air Force

Fleet Alternative Fuel Vehicle Acquisition Report

Compliance with EPAct 1992/2005 and E.O. 13149 for Fiscal Year 2006

This report summarizes the Department of the Air Force's (USAF) fiscal year (FY) 2006 fleet performance in meeting the requirements of the Energy Policy Act (EPAct) of 2005 (Public Law 109-58), and in meeting the goals of Executive Order (E.O.) 13149, "Greening the Government through Federal Fleet and Transportation Efficiency" (65 FR 24607), which was signed in April 2000 (Exhibit 1).

Exhibit 1. USAF's Performance in Meeting EPAct and E.O. 13149 Requirements, FY06

Authority/ Mandate	Performance Measure	Goal/Requirement	USAF Performance in FY06
EPAct 2005	Alternative fueled vehicle (AFV) acquisitions	75 percent of the covered light-duty vehicles (LDV) acquired in FY06 must be AFVs	Acquired 78.9% AFVs, earned additional credits ¹ for total of 1,605 credits; or 117 percent of covered acquisitions
	Alternative fuel use in AFVs	Utilize alternative fuels 100% of the time in AFVs	Achieved 21.1 percent alternative fuel use in all AFVs (Lack of alternative fuel infrastructure impeding our abilities to meet this mandate)
E.O. 13149	Fuel economy of light-duty non AFV acquisitions	Increase fuel economy by 3 miles per gallon (mpg) compared to FY99 baseline of 17 mpg	Increased to 21.1 mpg, an increase of 4.1 mpg over the FY99 baseline
	Petroleum consumption	Reduce covered consumption by 20 percent compared to FY99 baseline of 14,782,414 gasoline gallon equivalent (GGE)	Covered fuel consumed: 12,562,942 GGE, a decrease of 15 percent from the FY99 baseline

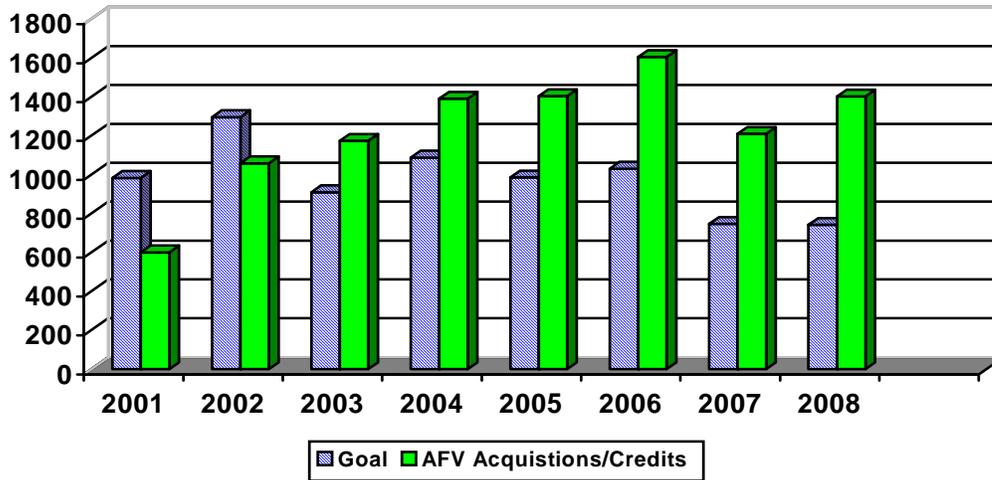
¹Earned credits for acquisition of dedicated light-duty AFVs and biodiesel consumption.

EPAct Compliance

For the fourth consecutive year, the USAF exceeded its EPAct requirements (Exhibit 2). As a result of its AFV acquisitions and biodiesel fuel use, the USAF in FY06 earned AFV acquisition credits amounting to 117 percent of its covered vehicle acquisitions, which is 42 percentage points higher than the 75 percent AFV acquisition requirement (Appendix A). In short, the USAF:

- Acquired 1,375 EPAct-covered LDVs. Of these, 1,085 or 78.9 percent were AFVs
- Received an additional 520 credits through the acquisition of dedicated medium-duty AFVs and the use of biodiesel
- Earned a total of 1,605 credits (including vehicle acquisitions and additional credits) or 117 percent of covered acquisitions

Exhibit 2. EPA Act AFV Acquisitions, Credits, and Requirements (Actual and Projected)



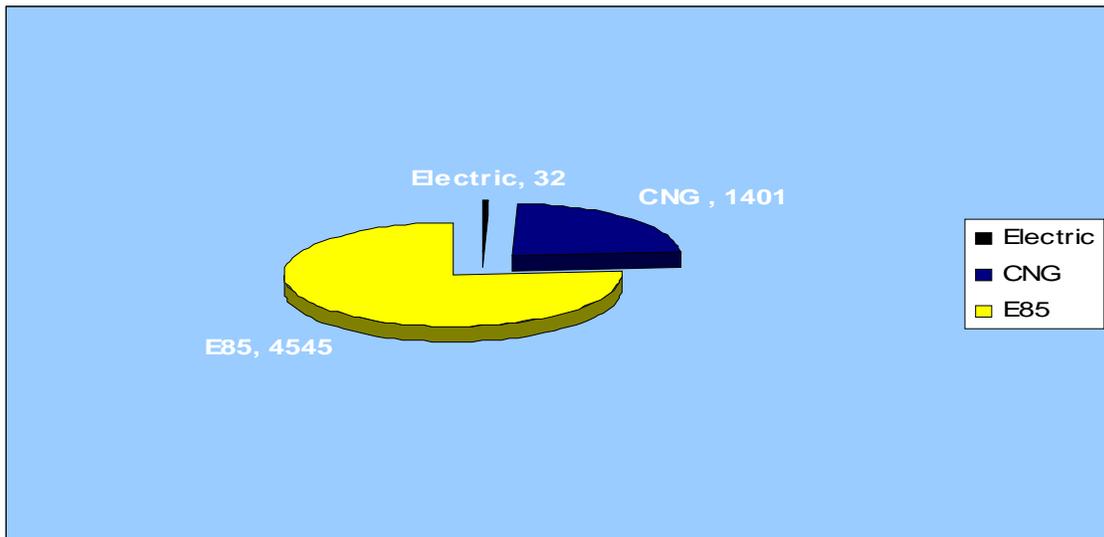
Credits

In FY06, the USAF earned 1,605 credits. Federal fleets earn one credit for every bi- or flexible-fuel AFV acquired and for every 450 gallons of neat biodiesel (B100) or 2,250 gallons of B20 (20 percent biodiesel and 80 percent petroleum diesel) used. Additional credits are earned for AFVs that operate exclusively on alternative fuels. For this reporting period, the USAF earned 1,085 credits for AFV acquisitions, 516 credits for biodiesel use, and 4 credits for purchasing two dedicated medium-duty AFVs.

Vehicles

Flexible-fuel vehicles (FFV) that can run on E85 (85 percent ethanol, 15 percent gasoline) or gasoline were the AFV of choice in FY06. Of the 1,085 AFVs acquired in FY06, 1,065 were FFVs and 20 were Compressed Natural Gas (CNG) vehicles. FFVs capable of operating on E85 comprise the majority of USAF's AFV fleet (Exhibit 3), with CNG and electric vehicles making up the balance. As the availability of CNG vehicle models decreases, these vehicle types will become less prevalent in USAF's fleet.

Exhibit 3. USAF's Total AFV Inventory



Exemptions

Of the 2,639 total LDVs acquired by the USAF in FY06, 1,264 vehicles (47 percent) were considered exempt from compliance with EAct. Exemptions are granted for fleet size, geographic location or use outside a Metropolitan Statistical Area/Consolidated Metropolitan Statistical Area (MSA/CMSA), and use for law enforcement. In FY06, exemptions were granted as follows:

- Fleet Size - 466 - All Recruiter Vehicles
- Geographic - 0
- Law Enforcement - 161
- Non-MSA/CMSA Operation/Fleet - 0
- Non-MSA/CMSA Operation/Vehicles - 637

FY07/08 Projected Acquisitions

The appendices to this report offer a detailed look at the USAF's FY06 acquisitions (Appendix A) and its projected acquisitions for FY07 and FY08 (Appendices B and C). As illustrated in Exhibit 2, the USAF has exceeded its annual EAct requirements since FY03 and plans to continue to exceed these requirements in the next 2 years.

E.O. 13149 Compliance

E.O. 13149 calls for each agency to reduce vehicular petroleum consumption by 20 percent by the end of FY06 and specifies three approaches agencies should take to achieve this goal:

- Comply with EAct's annual AFV acquisition requirements (as previously discussed)
- Use alternative fuels in fleet AFVs the majority of the time
- Increase the fuel economy of LDV Non-AFV acquisitions by 3 mpg by the end of FY06, as compared to baseline FY99 acquisitions

Use Alternative Fuels in AFVs

In FY06, 21.1 percent of the fuel used in AFVs was alternative fuels. As more alternative fuel infrastructure becomes available, this percentage will continue to increase. The USAF, in conjunction with DESC, is steadily working to balance funding constraints with the need to provide alternative fuels and associated refueling infrastructure to meet requirements. In FY06, eight projects were accepted for funding, totaling \$3.1M; DESC may be limited in its ability to provide near-term FY07 project funding, as it is working with DLA to develop FY07 funding and sourcing strategies. As alternative fuel stations come on line, more alternative fuel will be available for the bi- and flexible-fuel vehicles that dominate the USAF AFV fleet. The USAF will continue to work toward gaining access to alternative fuel for fleet vehicles. Exhibit 4 compares USAF's covered fuel use in FY06 and FY99. Alternative fuels comprise a growing portion of USAF's covered fuel use, representing 9 percent in FY06, up from 1.3 percent in FY99. Additionally, even though during this period the USAF was unable to attain a 20 percent reduction for our covered fuel consumption, it did decrease by 15 percent.

Exhibit 4. USAF's Total Covered Fuel Use

Fuel Use	FY99 (GGE)	FY06 (GGE)
Alternative Fuel		
B100	0	760,489
CNG	30,976	96,002
E85	2,851	374,017
M85	4,409	0
Electricity	818	1,788
LPG	0	0
Total Alternative Fuel Use	39,054	1,232,296
Covered Petroleum		
Diesel	4,960,218	2,569,709
DSL Component from Biodiesel	0	2,107,774
Gasoline	9,822,196	7,885,459
Total Covered Petroleum Use	14,782,414	12,562,942
<i>Total Covered Fuel Used in AFVs</i>	<i>1,954,500</i>	<i>2,241,175</i>
<i>Alternative Fuel Use as a Percentage of Total Fuel Used in AFVs</i>	<i>1.3%</i>	<i>21.1%</i>

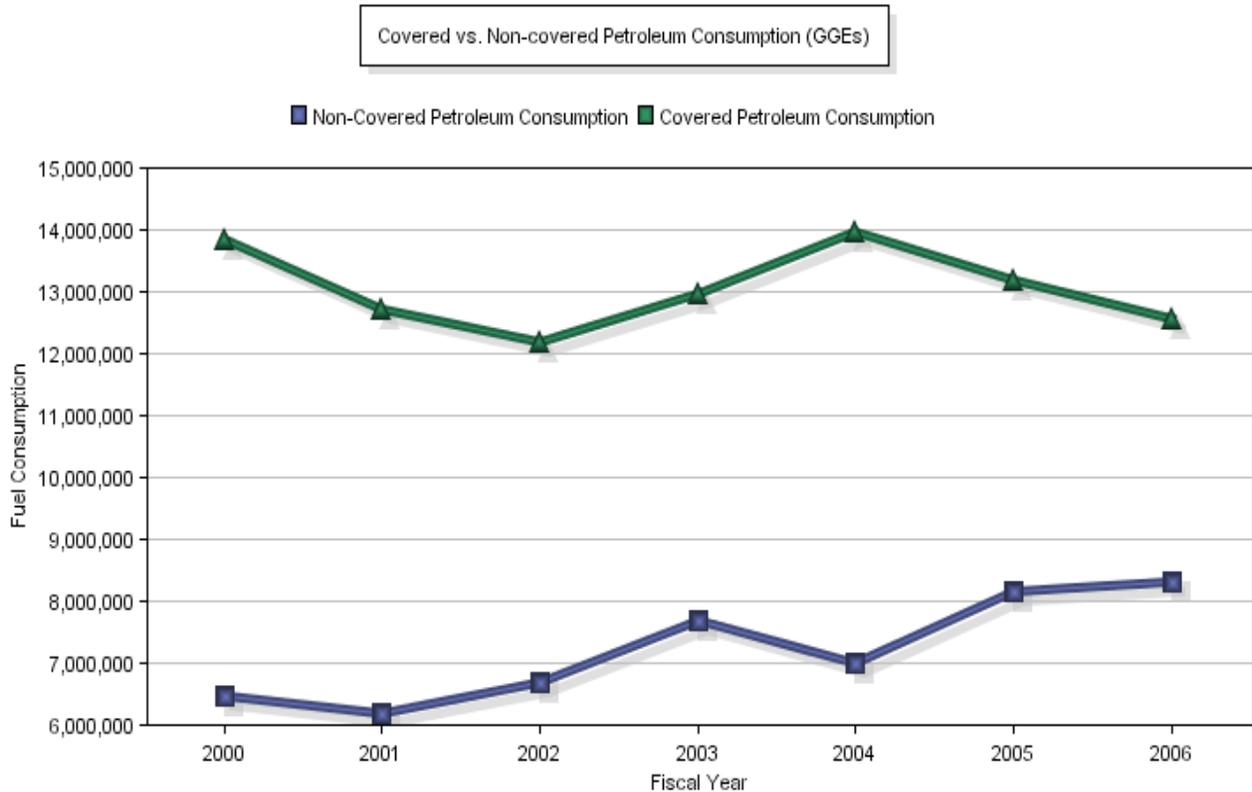
Improve Fuel Economy

Toward the petroleum reduction goal set forth in E.O. 13149, the E.O. calls for each agency to increase the fuel economy of its LDV acquisitions (excluding AFVs). Each year since FY99, the USAF has increased the average fuel economy of its Light Duty Non-AFVs and achieved a 4.1 mpg improvement in FY06.

Petroleum Consumption Progress Report

In FY06, the USAF consumed 1,232,296 GGE of alternative fuels and 3.9M gallons of biodiesel. Exhibit 5 shows that although the USAF has not reached the 20 percent reduction goal, it has been successful in reducing fossil fuel consumption by 15 percent and continued to reduce its dependency on foreign oil each of the last 5 fiscal years. Additionally, our on-base fuel consumption accountability is improving because DESC has now incorporated specific Air Force guidance for vehicle fuel key coding for better monitoring and depicting covered and uncovered fuel consumption.

Exhibit 5. USAF's Vehicular Petroleum Consumption



USAF Fleet Successes

Within the past fiscal year the USAF reduced 824 vehicle authorizations and right sized 891 vehicle authorizations. This was done by implementing an overall vehicle replacement strategy that aids fleet managers in determining the type of vehicle that best meets the customer needs and supports senior leadership strategy on reducing our dependency on foreign oil and decreasing air emissions. The prime factors for determining a vehicle authorization will be mission requirements/ops tempo, availability of alternative fuel infrastructure and historical/estimated annual miles driven. Local Fleet Managers will determine if a low speed vehicle (LSV), AFV or hybrid will first meet the customer's needs. If these types of conveyances will not meet the customer's needs, then a diesel engine-powered vehicle (if biodiesel (B20) is available locally) will be the next choice with a conventional gasoline vehicle as the last choice for a specific vehicle authorization. The Air Force's goal is to replace 30% of our light duty fleet with LSVs by FY10. We have programmed \$5.5M to procure 588 LSVs for FY07 and purchased 11 LSVs with FY06 money. The initiative to aggressively replace conventional vehicle authorizations with LSVs is receiving a great deal of senior Air Force leadership emphasis and oversight. The LSV MPG ratings are about twice that of conventional vehicles and can operate exclusively within the parameters of a military installation. Because of the enormous benefit of using LSVs in terms of reducing overall vehicle inventories and fossil fuel consumption, we would like the Department of Energy to incorporate the MPG ratings for these types of vehicles into E.O. 13149 calculations for increasing our MPG ratings for LD Non-AFVs.

The Air Force's Advanced Power Technology Office (APTO) presently has 16 Air Force specific projects involving hydrogen fuel cells/electric prototype vehicles, 13 joint services fossil fuel conservation projects and 17 Small Business Innovative Research (SBIR) phase I & II projects. The SBIR develops and tests various technologies in hybrid and electrical motor capabilities for vehicles and aerospace equipment. Following are some of the more significant projects presently being worked by the APTO:



**Modular Deployable Hydrogen Fueling Station
Congressionally Funded Hickam AFB Project:**

Develop crush proof; Department Of Transportation approved transportable, carbon steel packages for military and/or commercial transport. Three modular, deployable PODs make up the hydrogen refueling station to support the fuel cell vehicles at Hickam AFB HI.



**Hybrid Electric R-11 Aviation Refueler
Congressionally Funded Hybrid Electric Project:**

Air Force partnered with Mack/Volvo Power-train Division; to develop the R-11 Refueling Truck. It has a hybrid diesel electric power-train and uses regenerative energy for power assistance. The Hybrid electric Refueler is stationed at Charleston AFB for demonstration and validation. Delivered: Sept 30, 2006.



**Hydrogen Fuel Cell Powered Tow Tractor.
Congressionally Funded C2P2 Project:**

Convert a hybrid diesel - electric Bob Tail Tow Tractor to a hybrid hydrogen fuel cell – electric Bob Tail Tow Tractor. Removes diesel engine, fuel tank and diesel supporting auxiliary components and adds a hydrogen fuel cell, storage compartment, power management and auxiliary components. Delivered to Hickam AFB, HI 21 Oct 2006



**Robins AFB Micro Grid Fuel Cell Project
Congressional Funded C2P2 Project:**

This ten 5kW GenSys fuel cell system generates power from reformed propane gas. The Project will produce approximately 275,000 kWhs of electricity for Robins AFB over 12 month period. This Project demonstrates the reliability of continuous fuel cell operation as a power source for military and commercial use.



Wind powered Hydrogen Generation for Fuel Cell application.

Design and demonstrate feasibility of generating hydrogen using a wind turbine to power a water electrolyzer. Using 75% of the generated directly to facilities and 25% to generate hydrogen for Fuel Cells (fuel cell powered vehicle or facilities).



Fischer Tropsch Demonstration APTO Project

AF Senior Energy Focus Group tasking to demonstrate S-8 synthetic fuel in a field application. S-8 is produced using Fischer Tropsch process by Syntroleum. This is an out of the laboratory utilization of S-8 fuel in 2 pieces of support equipment and 3 vehicles.

Summary and Conclusions

In FY06, the USAF exceeded its EAct AFV acquisition requirements and expects to exceed them again in FY07 and FY08. Toward compliance with E.O. 13149, the USAF used alternative fuels in its AFVs 21.1 percent of the time, achieved a 4.1 mpg increase in fuel economy for light duty non-AFVs, and reduced its petroleum consumption by 15 percent as compared to FY99. The USAF is continuing its efforts to reduce petroleum consumption beyond the 20 percent requirement through increased alternative fuel usage, accelerated replacement of conventional vehicles with AFVs, and acquisition of hybrid and fuel efficient vehicles for fleets not covered by these requirements. The EOY FAST data implies that the Air Force processes for reducing its vehicle inventories, miles driven and ultimately its dependency on foreign oil are moving in the right direction.

The Air Force is working diligently in its efforts towards meeting EPA, DOE and DoD regulations and mandates. Since 11 Sep 01 to the present the USAF operations tempo is continually increasing making it more and more difficult to meet these mandates. Operations to support contingencies in Iraq and Afghanistan and other global commitments have steadily increased miles driven and fuel consumed. Despite this difficult era, the Air Force remained committed to reducing our fossil fuel consumption through our increased efforts to maximize E85, CNG and biodiesel fuel consumption wherever possible. Unfortunately, despite our aggressive AFV acquisitions, increased use of B20, E85, and CNG, increased mpg for light duty non-AFVs, and increased use of LSVs, we did not achieve the 20 percent fuel reduction goal for FY06 nor do we anticipate achieving it in the near future. We are relying heavily on the Air Force Petroleum Office (AFPET) to continue its efforts in obtaining alternative fuel infrastructure through DESC and we further expect them to work diligently at improving the availability of alternative fuels at locations that already have alternative fuel infrastructure in place. In any case, the current Global War on Terror and sustained security threat levels at stateside Air Force bases continue to complicate our efforts towards moving more aggressively in meeting EAct and E.O. mandates.

Finally, HQ USAF/A4RE will continue to provide guidance on obtaining and utilizing AFVs, LSVs, hybrids and alternative fuels to the maximum extent possible and will aid the major command and wing level logistic leaders with their efforts towards meeting EAct 1992/2005 and E.O. 13149 mandates.

Appendix A

Department of Air Force AFV Report 2006 - Actual

Actual Department of Air Force FY06 Vehicle Acquisitions					
Actual FY06 Light-Duty Vehicle Acquisitions					Total Vehicle Inventory
	Leased	Purchased	Total		
Total number of Light-Duty (8,500 GVWR) - Vehicle Acquisitions		1,968	671	2,639	17,259
Exemptions	Fleet Size	466	0	466	2,269
	Geographic	0	0	0	0
	Law Enforcement	107	54	161	906
	Non-MSA Operation (fleet)	0	0	0	0
	Non-MSA Operation (vehicles)	333	304	637	<i>(n/a)</i>
EPACT Covered Acquisitions		1,062	313	1,375	14,084
Actual FY06 AFV Acquisitions					Total Vehicle Inventory
Vehicle	Leased	Purchased	Total		
Sedan	CNG Bi-Fuel Subcompact	0	0	0	20
Sedan	CNG Bi-Fuel Compact	0	0	0	12
Sedan	E-85 Flex-Fuel Compact	377	1	378	1,365
Sedan	E-85 Flex-Fuel Midsize	34	0	34	138
Pickup 4x2	CNG Bi-Fuel	1	5	6	790
Pickup 4x2	CNG Dedicated	0	0	0	2
Pickup 4x2	E-85 Flex-Fuel	190	122	312	1,431
Pickup 4x2	Electric Dedicated	0	0	0	32
Pickup 4x4	CNG Bi-Fuel	1	0	1	25
Pickup 4x4	CNG Dedicated	0	0	0	1
Pickup 4x4	E-85 Flex-Fuel	76	22	98	269
SUV 4x2	E-85 Flex-Fuel	1	0	1	30
SUV 4x4	CNG Bi-Fuel	0	0	0	1
SUV 4x4	E-85 Flex-Fuel	29	8	37	335
Minivan 4x2 (Passenger)	E-85 Flex-Fuel	190	0	190	928
Minivan 4x2 (Cargo)	E-85 Flex-Fuel	2	0	2	4
Van 4x2 (Passenger)	CNG Bi-Fuel	0	0	0	13
Van 4x2 (Passenger)	CNG Dedicated	0	0	0	6
Van 4x2 (Passenger)	E-85 Flex-Fuel	0	7	7	23
Van 4x2 (Cargo)	CNG Bi-Fuel	0	0	0	18
Van 4x2 (Cargo)	CNG Dedicated	0	0	0	3
Van 4x2 (Cargo)	E-85 Flex-Fuel	0	1	1	3
Bus	CNG Bi-Fuel	0	0	0	2
Bus	CNG Dedicated	0	0	0	22
Pickup MD	CNG Bi-Fuel	0	11	11	255
Pickup MD	E-85 Flex-Fuel	0	5	5	13
Van MD (Passenger)	CNG Bi-Fuel	0	0	0	97
Van MD (Passenger)	CNG Dedicated	0	2	2	12

Van MD (Cargo)	CNG Bi-Fuel	0	0	0	28
Van MD (Cargo)	CNG Dedicated	0	0	0	8
MD 8,501-16,000 GVWR	CNG Bi-Fuel	0	0	0	75
MD 8,501-16,000 GVWR	E-85 Flex-Fuel	0	0	0	6
HD 16,001 + GVWR	CNG Bi-Fuel	0	0	0	9
HD 16,001 + GVWR	CNG Dedicated	0	0	0	2
Total Number of AFV Acquisitions		901	184	1,085	5,978
Zero Emission Vehicle Credits		0	0	0	
Dedicated Light-Duty AFV Credits		0	0	0	
Dedicated Medium-Duty AFV Credits		0	4	4	
Dedicated Heavy-Duty AFV Credits		0	0	0	
Biodiesel Fuel Usage Credits - Actual				516	
Total AFV Acquisitions with Credits		901	188	1,605	
AFV Percentage of Covered Light-Duty Vehicle Acquisition				117 %	

Appendix B

Department of Air Force AFV Report 2007 - Planned

Planned Department of Air Force FY07 Vehicle Acquisitions				
Planned FY07 Light-Duty Vehicle Acquisitions				
		Leased	Purchased	Total
Total number of Light-Duty (8,500 GVWR) - Vehicle Acquisitions		1,376	786	2,162
Exemptions	Fleet Size	777	0	777
	Geographic	0	0	0
	Law Enforcement	148	37	185
	Non-MSA Operation (fleet)	0	27	27
	Non-MSA Operation (vehicles)	84	93	177
EPACT Covered Acquisitions		367	629	996
Planned FY07 AFV Acquisitions				
Vehicle		Leased	Purchased	Total
Sedan	E-85 Flex-Fuel Compact	214	4	218
Sedan	E-85 Flex-Fuel Midsize	17	1	18
Sedan	E-85 Flex-Fuel Large	7	0	7
Pickup 4x2	CNG Bi-Fuel	2	0	2
Pickup 4x2	E-85 Flex-Fuel	69	166	235
Pickup 4x4	E-85 Flex-Fuel	7	13	20
SUV 4x2	E-85 Flex-Fuel	3	0	3
SUV 4x4	E-85 Flex-Fuel	31	6	37
Minivan 4x2 (Passenger)	E-85 Flex-Fuel	44	1	45
Minivan 4x2 (Cargo)	E-85 Flex-Fuel	2	0	2
Van 4x2 (Passenger)	E-85 Flex-Fuel	32	4	36
Van 4x2 (Cargo)	CNG Bi-Fuel	2	0	2
Van 4x2 (Cargo)	E-85 Flex-Fuel	4	40	44
Bus	LPG Bi-Fuel	3	0	3
Pickup MD	CNG Bi-Fuel	18	0	18
Pickup MD	E-85 Flex-Fuel	10	131	141
Van MD (Passenger)	CNG Bi-Fuel	3	0	3
MD 8,501-16,000 GVWR	E-85 Flex-Fuel	2	0	2
Total Number of AFV Acquisitions		470	366	836
Zero Emission Vehicle Credits		0	0	0
Dedicated Light-Duty AFV Credits		0	0	0
Dedicated Medium-Duty AFV Credits		0	0	0
Dedicated Heavy-Duty AFV Credits		0	0	0
Biodiesel Fuel Usage Credits - Planned				374
Total AFV Acquisitions with Credits		470	366	1,210
AFV Percentage of Covered Light-Duty Vehicle Acquisition				121 %

Appendix C

Department of Air Force AFV Report 2008 - Projected

Projected Department of Air Force FY08 Vehicle Acquisitions				
Projected FY08 Light-Duty Vehicle Acquisitions				
		Leased	Purchased	Total
Total number of Light-Duty (8,500 GVWR) - Vehicle Acquisitions		1,372	920	2,292
Exemptions	Fleet Size	760	0	760
	Geographic	0	0	0
	Law Enforcement	125	71	196
	Non-MSA Operation (fleet)	0	0	0
	Non-MSA Operation (vehicles)	113	233	346
EPACT Covered Acquisitions		374	616	990
Projected FY08 AFV Acquisitions				
Vehicle		Leased	Purchased	Total
Sedan	E-85 Flex-Fuel Compact	207	4	211
Sedan	E-85 Flex-Fuel Midsize	9	0	9
Pickup 4x2	CNG Bi-Fuel	6	0	6
Pickup 4x2	E-85 Flex-Fuel	31	330	361
Pickup 4x2	M-85 Flex-Fuel	12	0	12
Pickup 4x4	E-85 Flex-Fuel	1	5	6
Pickup 4x4	M-85 Flex-Fuel	4	0	4
SUV 4x2	E-85 Flex-Fuel	4	0	4
SUV 4x4	E-85 Flex-Fuel	14	125	139
Minivan 4x2 (Passenger)	CNG Bi-Fuel	1	0	1
Minivan 4x2 (Passenger)	E-85 Flex-Fuel	5	4	9
Minivan 4x2 (Passenger)	M-85 Flex-Fuel	2	0	2
Van 4x2 (Passenger)	E-85 Flex-Fuel	87	3	90
Van 4x2 (Cargo)	E-85 Flex-Fuel	0	2	2
Pickup MD	CNG Bi-Fuel	15	0	15
Pickup MD	E-85 Flex-Fuel	6	133	139
SUV MD	E-85 Flex-Fuel	1	0	1
MD 8,501-16,000 GVWR	E-85 Flex-Fuel	0	18	18
Emergency/Emergency Response MD 8,501-16,000 GVWR	Electric Dedicated	0	1	1
Total Number of AFV Acquisitions		405	625	1,030
Zero Emission Vehicle Credits		0	0	0
Dedicated Light-Duty AFV Credits		0	0	0
Dedicated Medium-Duty AFV Credits		0	2	2
Dedicated Heavy-Duty AFV Credits		0	0	0
Biodiesel Fuel Usage Credits - Projected				371
Total AFV Acquisitions with Credits		405	627	1,403
AFV Percentage of Covered Light-Duty Vehicle Acquisition				142 %